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THE

Fruit of the Vine.

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THE

Fruit of the Vine.

THE £100 PRIZE ESSAY.

BY THE REV. H. T. BURGESS.

Published by the South Australian Total Abstinence
League and Band of Hope Union.

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PREFACE.

The Annual Conference of the South Australian Total Abstinence League and Band of Hope Union in 1876 had under consideration the want of an essay on the wine question bearing *specially on the colonies*, and containing the latest information from the schools of science. The report presented by the Committee introduced the subject in the following paragraph:—

"The Wine Question.—Several articles have appeared in the public Press upon the wine question, and as its manufacture is a source of profit, there is a desire on the part of the Press to encourage it as an article of consumption and commerce, notwithstanding it is well known as one of the most prolific sources of the worst phase of intemperance. While your Committee regard the fruit of the vine as one of the choicest of Heaven's gifts to man, it is lamentable that it should be perverted to the basest of purposes. With a desire that the wine question as applied to the Australian colonies should be fully ventilated, your Committee would urge that during the coming year a prize of £100 be offered for the best essay on the fruit of the vine, exposing the fallacy that alcoholic wines possess any claim as an article of diet, and detailing the most profitable and valuable uses to which the fruit of the vine can be applied, and its purity preserved, based upon scientific, historical, and experimental facts."

The report having been adopted it was subsequently decided to offer a second prize of £25, and in response to the advertisement three essays were sent in and submitted to the following gentlemen, who had kindly consented to act as adjudicators:—Rev. William Roby Fletcher, M.A., H. T. Whittell, Esq., M.D., and H. C. Scarfe, Esq.

The following is an extract from the adjudicators' report forwarded to Mr. G. W. Cole, Hon. Sec. to the Committee:—

"We have carefully considered the merits of the essays on the Wine Question which you have submitted to us, and are unanimously of opinion that the essay bearing the motto, '*Levius fit patientia*,' and entitled, 'The Fruit of the Vine,' is the best."

The adjudicators' report was submitted to the Annual Conference, May 24, 1878, and adopted, and a correspondence having been opened with the authors of the unsuccessful essays, it was decided to divide the second prize between them. Extracts from these, bearing on the profitable utilization of the fruit of the vine, will be found in an appendix, to make room for which the essay has been somewhat abbreviated. It is now submitted to the public by the League in the earnest hope that it will prove of essential service to the temperance movement, in the interests of which it is issued.

Temperance Hall,
North Adelaide, 1878.

AUTHOR'S PREFACE.

ALTHOUGH this is regarded as an essay on the Wine Question, it does not pretend to be an exhaustive discussion of the whole subject. Its scope was limited by the resolution of the Committee to two important topics out of many that might advantageously be considered. An exposure of the fallacy described in that resolution, and a detailed statement of the profitable uses of the grape, based upon historical, scientific, and experimental facts, necessarily involves large reference to established authorities, and limited space has in many cases prevented extended comment upon their statements. I have, however, endeavoured to secure local colour, obtain local data, and make a local application so far as was possible to me, and my best thanks are due to many gentlemen who kindly furnished me with valuable information.

The essay was written amid the pressure of peculiarly heavy ministerial duties. It was interrupted and its completion well-nigh rendered impossible by a protracted and severe affliction. I am conscious of its many blemishes and defects; but it is at least an earnest attempt to show that while the culture of the grape may and ought to be a profitable and flourishing industry, the production of colonial wine is a gigantic evil. The latter of these considerations by its seriousness, so powerfully engrosssed my mind that I paid less attention in proportion to the former. Nevertheless, I am so fully alive to the practical importance of this subject that I have willingly curtailed the original essay so far as was necessary to include the suggestions contained in the Appendix within the limits prescribed by the advertisement of the Committee.

Habits of sobriety, and the intelligent employment of natural advantages, are among the things essential to the well-being of any community. Anxiously desiring the welfare of my fellow-colonists, among whom I have lived almost thirty years, I commend the following pages to their candid consideration in the full belief that they will find the conclusions I have arrived at are amply sustained. I also indulge the hope that the hands of temperance advocates will be strengthened, and the best interests of the people promoted by the cause of sobriety and morality being advanced.

H. T. B.

Adelaide, August, 1878.

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* * *

THE FRUIT OF THE VINE.

INTRODUCTION.

The fallacy stated—The delusion wide-spread and costly—The drink question many-sided—Enquiry defined—Argument stated. Second topic—Its bearing.

Two distinct subjects have to be dealt with in this essay, and it will be most convenient to consider them separately. The first relates to the popular and pernicious fallacy that alcoholic wine is a valuable article of diet, one result of which is that the fruit of the vine often becomes a curse instead of a blessing; the second, to the best and most legitimate means by which the blessing may be profitably and fully enjoyed. By the conversion of grapes into wine the bounties of nature are wasted, and, what is worse, are perverted into a most terrible evil. Intoxicating liquors are responsible for an aggregate of crime, disease, and misery which is simply appalling. Those who manufacture, traffic in, and consume them generally admit this statement, but seek to justify their practice on the ground that they are only injurious when taken in excess, and possess in themselves many beneficial qualities. It is confidently assumed that alcoholic wine is the natural product of the grape, and was originally provided for by the Creator. On these points we join issue. Although the evils of intemperance do not directly enter into the discussion, the exposure of the fallacy which largely contributes to their perpetuation will, it is hoped, be helpful to the cause of temperance reform.

Unhappily the delusion is wide-spread and firmly rooted as well as mischievous. By vast numbers of nearly all classes, alcoholic drink of some kind is regarded as one of the common necessaries of life. Crowds of the squalid and poverty-stricken in great cities learn to depend as if for breath on the fiery stimulant of gin. Multitudes of labouring men believe their strength depends on their supply of beer. Many nursing mothers are taught to rely on porter or ale for the means of nourishing their offspring. The dinner tables of the wealthy are usually considered incomplete without an array of different kinds of wine, from sherry to champagne. Ardent spirits are consumed to an enormous extent by all classes, ostensibly as an aid to digestion, a preservative against disease, or an antidote to mental depression. In these colonies it is no uncommon thing to hear that the severe toil of the harvest field cannot be endured, or the fierce heat of summer be borne, without an ample supply of "harvest wine." Are these opinions correct? The extent to which they prevail may be gathered from that to which they are acted upon. It is calculated that the manufacture and trade in alcoholic drinks in England alone employs an invested capital of £117,000,000! The amount expended in one year in Great Britain is said to amount to £147,000,000; and by the forty millions of people in the United States over £120,000,000 is thus spent annually. The vastness of these sums would be incredible were they not authenticated by official records. Such being the enormous outlay upon that which is the prolific parent of all shades of crime and all forms of misery, the question is forced upon every thoughtful mind whether it is really required by the wants of human nature.

The drink question is multiform and many-sided. The legislator, who perceives the necessity of placing the manufacture and sale of intoxicants under guards and restraints, finds in it one of the most difficult and perplexing of problems. Social reformers, who justly regard it as the fountain of most of the misery and the cause of nearly all the crime in the world, ceaselessly endeavour to mitigate the woes it produces, and to check the evils it inflicts. Political economists have ample reason to study the effect it has on the revenues and expenditure of the community, the waste it involves, the losses to which it leads, and its detrimental influence on national wealth, progress, and prosperity. These and similiar considerations necessarily run into each other, but our present enquiry will be kept as distinct and definite as possible. It does not necessarily or primarily touch the social, moral, or fiscal aspects of the question. With the possible usefulness of alcoholic fluids for manufactures or for medicine we have little to do in considering the popular estimate of their place among necessary and useful articles of diet. It may be boldly stated that this is utterly erroneous. It is founded upon a total misapprehension of their character. In the following pages it will be shown that such beverages, and in particular wine, afford little or no nourishment to the human system, are absolutely injurious to health; their sole recommendations to popular favour are stimulating qualities and agreeable taste; and they therefore have no claim whatever to be regarded as essential, serviceable, or profitable for food. In support of this position the following series of propositions may be submitted, which, if established, will amply demonstrate the correctness of the view adopted:—1. The exhilarating property which is the chief general characteristic of wine is due to the amount of alcohol it contains, and this is not food in any sense of the term. 2. Alcohol is injurious to health, however disguised and concealed, even when imbibed in small quantities, and when taken freely is an active poison. Any drink, therefore, of which it forms a considerable percentage, is directly baneful in its character. 3. Stimulants do not impart strength. Health and vigour both of body and mind can be better preserved, and work of all kinds better performed, without than with their employment. 4. Wines in general owe what are regarded as their agreeable characteristics not to the excellencies of the juice of the grape, but to the vitiated taste of the consumer, the arts of the maker, and deleterious adulterations. 5. The supposition that Australian wine is free from condemnation, and entitled to popular approval because it is the uncorrupted "blood of the grape" is wholly incorrect, the character of the original product being totally changed in the manufacture. 6. Most of the liquor manufactured, sold, and used as colonial wine is open to the gravest objections, on the ground of its peculiar and exceptionally harmful character.

The second snbject to which attention is invited is not usually so immediately connected with the temperance movement as the first, but is nevertheless of considerable importance. Australia, both by its soil and climate, is eminently fitted for the culture of the vine. That industry has already attained extensive proportions, and is capable of indefinite development. From time immemorial the fruit of the vine has been regarded as one of the choicest gifts of God. If it can be shown that it can be successfully and profitably cultivated and used, on strictly total abstinence principles, the groundless reproach which is sometimes made against abstainers, of despising a providential boon, will be completely swept aside, and other advantages secured. The task of showing that profitable and valuable use may be made of the fruit of the vine, without destroying its excellence or imparing its purity, will be neither difficult nor doubtful.

PART I.

ALCOHOLIC WINE AS AN ARTICLE OF DIET.

CHAPTER I.

Alcohol Not Food.

Wines greatly diverse—Yet possess certain general characteristics—Professor Johnston's analysis—Small proportion and poor quality of Solids—Alcohol principal constituent—Its proportion—Popular taste and prejudice—T. G. Shaw on "bottle-stink" and wine tasters—Dr. A. Wynter—Wine used for exhilaration—Its agent, "the Devil in Solution; alcohol"—Not a creature of God—Its chemical nature—Dr. B. W. Richardson's analysis—Not food—Two classes of foods—Alcohol contains no nitrogen, therefore cannot build up the body—If fat-forming injurious—Is it heat producing?—Dr. Richardson's researches—Alcohol *reduces* temperature—Not food in either sense—Excitment not strength—As a condiment hurtful—Summary of case against alcohol—Richardson—Other authorities, Liebig, Dr. E. Smith, French experts, *British Medical Journal*, Sir Astley Cooper—Nutrition in beer and wine—Final verdict.

With perfect propriety we may say of wine—its name is legion. A complete catalogue of the wines of the world would include several hundred varieties. A thousand circumstances go to vary their composition and quality. They can be made without grapes as well as with, and the counterfeit will be accepted even by experts as genuine. The produce of different countries varies with the character of the climate, the nature of the soil, the variety of the grape, the mode of culture, and the manner of treatment. Wine from the same vineyard differs according to the nature of the season, the ripening of the fruit, the fermenting of the must, the manipulation it receives, the temperature at which it is kept, and the length of time it is preserved. These and numerous other conditions affect the produce of the vintage, affording endless scope for the skill of the vigneron, and the indulgence of fancy or caprice on the part of the consumer.

While, however, there are these diversities, certain general characteristics are invariably present in fermented grape wines. Chemical science has been largely employed in their examination, and there is no lack of analyses to choose from. It is desirable to select an author whose statements are neither so abstruse as to be unintelligible to the general reader, nor so loose as to be chargeable with a want of scientific accuracy, and who is, at the same time, both competent and impartial. Professor Johnston's "Chemistry of Common Life" fulfils these requirements, and furnishes just such an analysis of wine as it is essential to have at the outset of this discussion.

According to this writer, all grape wines contain—"(*a*) A notable proportion of alcohol, or pure spirit of wine. This proportion is different in different kinds of wine, and varies considerably also in wines of the same kind. (*b*) A more or less sensible quantity of grape sugar which has escaped the decomposing action of the fermentation. This gives to wines their sweet taste and fruity character. Wines are called dry when they contain little sugar, and the extreme fruitiness of some port wines is indicated by the large proportion of sugar which this variety of wine sometimes contains. (*c*) A variable proportion of free acid, which imparts to them a more or less distinctly sour taste. Neither malt, beer, nor cider are ever quite free from acid, and the same is the case with wine; only the grape wine is made sour by tartaric acid. Wines made from unripe grapes sometimes contain another peculiar acid which resembles the acid of lemons (citric acid), but this acid disappears from the fruit as it ripens. Tartaric acid exists in the juice of the grape in combination with potash, forming what is called bi-tartrate of potash, or cream of tartar—a substance which has a well-known sour taste. When the fermented juice is left at rest, this bi-tartrate gradually separates itself from the liquor, and deposits itself as a crust or tartar on the sides of the casks and bottles. (*d*) A minute proportion of an ethereal substance to which the name of œnanthic ether is given, and to which grape wines owe the agreeable vinous flavour which characterises them all. When obtained in a separate state this ether is a very fluid liquid, of a sharp, disagreeable taste, but having an odour of wine so excessively powerful as to be almost intoxicating. It does not exist in the juice of the grape, but is produced during the fermentation. It seems also to increase in quantity by keeping, as the odour of old wines is stronger than that of new wines. So powerful is the odour of this substance, however, that few wines contain more than one-forty-thousandth part of their bulk of it! Yet it is always present, can always be recognised by its smell, and is one of the general characteristics of all grape wines. (*e*) Besides the general vinous flavour derived from this œnanthic ether, all wines contain one or more odoriferous, more or less fragrant, substances, to which the peculiar *bouquet* or scent of each is due. As these give the special character to the wine they are more or less different in each variety. They are present even in more minute quantity than the œnanthic ether, and their chemical nature is as yet very little understood."

From this description it will be seen that besides water, wine contains alcohol, sugar, acids, œnanthic ether, and bouquet. The two last-named properties are microscopically minute, but upon them chiefly depends the delight or the disgust of the connoisseur. Sugar and acid play an important part in determining the hygienic character of wine, but the proportions of these are insignificant as compared with alcohol. Other ingredients than those referred to by Professor Johnston are mentioned by various chemists, but in considering their relative importance it must be remembered that the quantity is almost infinitesimal. Fauré found three parts of tartrate of iron in 10,000 parts of wine, and four to six parts of tannic acid in the same quantity; but Professor Mulder considers this amount over-stated! How extremely little solid matter exists in the most common kinds of wine may be seen by the following extract from a table prepared by Mr. H. Williams Jones, F.R.M.S.:—

	TOTAL SOLID MATTER.
Fine old port	5¾ parts per cent.
New port	6¾ "
Public-house port	5¼ "
Old sherry	2½ "
Public-house sherry	4½ "
Common claret...	5 "
Good claret	2¼ "

This table shows the solid matter in wine to be as small in quantity as we know it to be poor in quality. Even the best of it has very little nutritive value, and a considerable proportion is absolutely worthless. While dealing with the constituents of wine, the following "recipe for port wine in wood" is worth reproducing: —"Port wine, eight gallons; brandy, six gallons; sloe juice, four gallons; strong rough cider, forty-five gallons." An analysis of a bottle of port by a celebrated analyst, published in the *Mechanics' Magazine*, is as follows:—"Spirits of wine or alcohol, three ounces; decoction of logwood, four ounces; cider, fourteen ounces; sugar, one and a-half ounces; alum, two scruples; tartaric acid, one scruple." All these statements agree in representing alcohol as the principal ingredient in wine. It is upon this that its stimulating character depends, and the minor substances and essences, though they give the peculiar colour, sparkle, fragrance, and flavour which charm the eye or gratify the palate, contribute but little to whatever power to cheer or strengthen it is supposed to possess.

No definite statement of the proportion of alcohol in wine is possible, for there is no uniformity. Much diversity exists between different varieties, and even between different vintages from the same vineyard, owing to the varying character of the season. In any case, however, the proportion is large. Professor Johnston says the proportion of absolute alcohol by measure is :—

Port,	21 to 23 per cent.	Sherry,	15 to 25 per cent.
Madeira,	18 to 22 "	Claret,	9 to 15 "

It must be noticed that "absolute alcohol" is twice the strength of "proof spirit." The natural strength of European wines is much below that which the English palate prefers, and spirit is added to meet the demand. Australian wines have naturally an average alcoholic strength of about twenty-six per cent., but even at that high rate wine-growers find it their interest to largely fortify them with brandy. It would be difficult, if not impossible, to get at a trustworthy average of the alcohol in the liquor sold in colonial wine-shops; but considering that it is naturally in excess of European wines, and the practice of adding spirit is generally adopted by manufacturers, it is not likely to be much below the English standard. What that is we know on the authority of English wine-merchants. One of Gilbey's wine circulars says :— "As we consider it important for every one to be acquainted with the strength of wines, we annex the scale, taking an ordinary bottle of proof spirit as the unit:—

"Twelve bottles of sherry, strength 38 per cent., contain about 4½ bottles of proof spirit.
"Twelve bottles of port, strength 38 per cent., contain about 4½ bottles of proof spirit.
"Twelve bottles of marsala, strength 33 per cent., contain about four bottles of proof spirit.
"Twelve bottles of cape, strength 33 per cent., contain about four bottles of proof spirit.
"Twelve bottles of champagne, strength 23 per cent., contain about three bottles of proof spirit.
"Twelve bottles of burgundy, strength 22 per cent., contain about 2⅝ bottles of proof spirit.
"Twelve bottles of claret, strength 18 per cent., contain about 2⅙ bottles of proof spirit.
"Twelve bottles of hock and moselle, strength 17 per cent., contain about two bottles of proof spirit."

According to this scale the proportion varies from 17 to 38 per cent., but other statements show that in the strongest wines the proportion of absolute alcohol by volume is upwards of one-fourth, and the percentage of proof-spirit in degrees of Sikes' hydrometer reaches nearly forty-five.

An almost infinite amount of labour has been expended in the effort to correct the depraved taste of the British public, and gain for milder wines popular approval. Statesmen have considered the question with the result of altering the tariff, so as to admit light French wines to the English market at rates which will allow of their being sold cheaply. Chemists have detected and exposed the practice of adulteration over and over again. Merchants have published the tricks of the trade with such persistency that it seems a wonder they retain any of their customers. Very partial success, at most, has rewarded these endeavours, and colonial vignerons continually lament that the vitiated taste for artificial wines, combined with the restrictive tariff, still keeps their commodities out of the British markets. It is instructive to notice the arguments and appeals on this subject. Manufacturers of intoxicating wine announce themselves as champions of temperance, and hail Mr. Gladstone as their apostle, because, following his great leader, Mr. Cobden, he supplemented the gift of cheap bread with that of cheap wine. Without accepting their premises, adopting their arguments, or endorsing their conclusions, we may yet make a good use of the facts they have published. From their condemnation of the most popular wines of commerce two conclusions may fairly be inferred:—First, that the majority of these "wines" are vile decoctions, unworthy of their name; and, second, that in spite of all opposition they retain their hold with singular tenacity.

It is amusing as well as instructive to notice the contempt expressed by wine-producers for the judgment of connoisseurs. One of them refers to an Adelaide Banker, who condemned a sample of port which had cost 85s. per doz. in London as having the "colonial twang," he being under the impression that it was the produce of the vineyard where he tasted it. This is quoted as a specimen of obstinate and unreasonable prejudice. Very likely. But it only proves that a prejudice does exist for bad, fiery liquor. The enthusiasm which prevails about certain kinds of wine is positively ludicrous. Fabulous sums are sometimes given for "fine, old, crusted port," just as fancy prices are paid for old pictures and china; and it is worth while hearing what a high authority thinks of its real merit. Mr. T. G. Shaw, the eminent wine merchant and author, says it is scarcely possible for wine to continue many years in contact with a black crust and cork without deterioration. He further mentions as a well-known fact that almost every third cork containing very old wine is decayed and has a bad smell, which it imparts to the wine. When port has been fifteen or twenty years in bottle it has what wine merchants call the "bottle stink." Mr. Shaw says:—"If with this 'bottle stink' it is declared to be, and buyers believe it to be, a 'real vintage 1820' ten guineas per dozen will be a small price to pay for it. A few years ago anything black enough and with a touch of the elegant 'bottle stink' was immediately saleable at high prices, and much ransacking at public sales, as well as in public-houses, there was to find such profitable merchandise." The truth appears to be that no dependence whatever ought to be placed on taste and fancy. Mr. Shaw mirthfully records the tricks he used to play on certain experienced stagers who were supposed to possess a wonderfully correct taste, and whose wisdom and judgment were shown, like Lord Burleigh's, by a shake of the head. There were three of these worthies who were accustomed to express themselves so authoritatively that he felt peculiar pleasure in taking them in. When they were oracularly laying down the law and discovering differences in casks of the same mark, which he knew to have been shipped as exactly the same, he used to get the cooper to draw two glasses from the same pipe and announce them as from different numbers. He says the trick "was invariably successful, for they were sure after tasting and retasting and much profound thought to pronounce the verdict that although similar one possessed rather more of this or that than the other. I kept my own counsel, but was convinced forty years ago, and the conviction remains to this day, that in wine-tasting and wine talk there is an enormous amount of humbug."

From the rivalry and experience of wine-merchants, therefore, as well as from the laboratory of the chemists, we obtain weapons pointed the same way, and facts teaching the same lesson. Independent observers add their testimony to the conclusion that taste is fickle, fancy capricious, judgment unreasonable, and in spite of all persuasion to the contrary, appetite continues strong in its demand for liquor which shall possess in a high degree the power of inebriation. Dr. Andrew Wynter, in a lively chapter entitled "A Hint to Port Wine Drinkers," says:—"As a rule, the English do not like light wines; that is, wines of a low alcoholic strength. Northern nations, as a consequence of their climate, demand a stronger wine than do those of the south. We possess this desire in common with the Danes, Swedes, and Russians. The polite classes, it is true, favour claret, but the polite classes possess many sources of excitement and exhilaration not open to the general public." While he does not think it is likely to be generally favoured in England, he objects to the cry raised against it that it is acid, wishy-washy, and likely to produce pains in the stomach. He complains of the ignorance of the public in this respect, and points out that sweet wines often contain and cause a large amount of acidity. For all that, however, in his opinion, the stream of public opinion is not setting in towards pure wines, that is, wines which have not been mixed and adulterated with spirit.

Most likely this conclusion will prove to be correct, for among English people wine is drunk chiefly because it is exhilarating. It makes the cheek glow, the eye sparkle, the wit lively: it elevates the spirits, makes the pulse beat quicker, and produces a general exaltation. Deeply-rooted customs connect it with convivial gatherings; they require it as a token of good-fellowship and an exhibition of hospitality. All that has been said or sung in praise of wine testifies to its power for producing enlivening effects which we know it owes to the potent spirit within it. Thus Moore (after Anacreon) sings:—

"Proclaim the laws of festal rite,
I'm monarch of the board to-night;

And all around shall brim as high,
And quaff the tide as deep as I!
And when the cluster's mellowing dews
Their warm, enchanting balm infuse,
Our feet shall catch the elastic bound,
And reel us through the dance's round.
Oh Bacchus! we shall sing to thee
In wild, but sweet ebriety."

It is possible so to garnish a sepulchre that all men shall hold their breath in admiration of its beauty. The spirit of darkness can, if need be, simulate the appearance of an angel of light. The wine cup may be garlanded with flowers, decked with vine-leaves, and entwined with tendrils; its hue be brilliant, and its breath odoriferous, and yet be the abode of a deadly serpent. When we peer curiously through its meretricious adjuncts, translate poetry into prose, reduce fiction to fact, and enquire what it is that causes jollity and merriment, drives dull care away, provokes mirth and hilarity, produces wreathed smiles and exuberant gaiety, the song, the dance, the jest, and the laughter which rises louder as the wine circulates more freely; one answer alone can be given—"the devil in solution—alcohol!" This powerful agent pervades all intoxicants from small beer to Scotch whisky, and is their one essential constituent. The bouquet and other accessories are but the drapery and disguises in which he is clothed to please the fancy of his worshippers. The efficacy of wine to cheer and its capability of giving pleasure depend absolutely upon his presence. It is true the connoisseur may bring his glass admiringly between his eye and the light, hold his nose over it to inhale the perfume, and roll its contents in his mouth for five minutes to linger on the exquisite flavour, but whoever saw a guest at a dinner-party behaving in so ill-bred a fashion? No. It is alcohol that inspires. To him legitimately belongs whatever praise or censure the wine deserves, and they are his offices which without naming them the ordinary wine drinker invokes. Alcohol, and plenty of it, the English consumers of wine imperatively demand, and the national estimate of its importance was never more strikingly put than in Dr. Johnson's famous declaration. Boswell says that the great lexicographer harangued upon the qualities of different liquors. He spoke with great contempt of claret as so weak that "a man would be drowned by it before it made him drunk." Being persuaded to drink one glass that he might refresh his recollection, he shook his head and said—"Poor stuff! No, sir; claret is the liquor for boys, port for men, but he who aspires to be a hero must drink brandy."

Having seen the important position occupied by alcohol as a constituent of wine and other intoxicating liquors, it now becomes necessary to ascertain definitely what it is, and what it does, in order that the alimentary character of these drinks may be rightly understood.

Ancient mythology deified the discoverers of wine, and modern tipplers denounce abstainers for vilifying "a good creature of God." The denunciation is as unscientific as it is unjust, and as unsubstantial as the visionary deites of ancient times. Alcohol is no more a good creature of God than is gunpowder. It is not a product of nature, but a combination wrought by human ingenuity. Nowhere in the wide realm of creation can it be found in the form in which it is consumed by man. By the art of the chemist it is wrung from substances which as they come from God are wholesome and nutritious, and the process robs them of that which constitutes their value. It is evolved by the threefold means of destruction, decomposition, and re-construction. "Thus" (says Youmans) "a cause of the rapid decay of wood under certain circumstances, is the presence of albumen in its sap. The albumen readily putrefies and imparts its own state to the woody substance. The patent kyanising process for preserving wood consists in throwing the albumen of its sap into an unchangeable state. In the same manner sugar is changed. A solution of pure sugar in water remains for any length of time unaltered; but if a nitrogenised substance in process of decomposition, as putrefying flesh, blood, cheese, dough, or white of egg, be added to a solution of sugar in water, a change promptly occurs; the sugar disappears, carbonic acid is produced in large quantities, the liquid loses its sweet taste, acquires a peculiar flavour, and is found to obtain a new substance called alcohol." A host of authorities might be cited in support of the statement that alcohol is not a product of nature, that is, that it is not found ready formed in either the animal, vegetable, or mineral kingdoms without the agency of man. Sir Humphrey Davy in his Lectures on Agricultural Chemisty, says—"Alcohol, or spirits of wine, has been often mentioned in the course of these lectures. This substance was not described amongst the vegetable principles, because it has never been found ready formed in plants." Dr. Turner, in his Elements of Chemistry, makes a precisely similar statement—"Alcohol is the intoxicating ingredient of all spirituous and vinous liquors. It does not exist ready formed of plants, but is a product of the vinous fermentation." In Parke's Chemical Catechism, it is stated that "Chemists have not only the power of decomposing natural bodies, but of producing, by certain combinations, various other substances such as are not found in the kingdoms of nature. Alcohol and ether are both of this class."

Chemical analysis of alcohol resolves it into the three simple elements of carbon, oxygen, and hydrogen. It is produced by fermentation—a process, speaking popularly, in which nitrogenous substances, such as vegetable juices, by their putrefaction induce decomposition in other compounds. All liquids containing sugar, such as the juice of the grape, are capable of this process, provided there be present sufficient albuminous matter to produce and sustain the action. Thus the sweet juices of the sugarcane, maple, palm tree, and cocoanut; the juice of apples, pears, peaches, currants, grapes, and of numerous other fruits and vegetables, are capable of fermentation, and can be employed as sources of alcohol. Only one variety of sugar, namely, grape sugar, can be directly converted into alcohol. The other kinds must be changed into this form before alcohol can be produced from them.

In dealing with the nature and effects of alcohol, both in this and the next chapter, I shall avail myself largely of the Six Cantor Lectures on the subject, delivered by Dr. B. W. Richardson, M.A., F.R.S., in 1874; and it will be more convenient both for the writer and the reader to make this general statement rather than to indicate each separate reference and quotation. In answering the question, What is alcohol? Dr. Richardson says a modern chemist would describe it as an organic radical called ethyl, combined with the elements of water. Water is composed of two elements, called hydrogen and oxygen, two equivalents of hydrogen being combined in it with one of oxygen. The radical called ethyl is a compound of carbon and hydrogen, and this radical in alcohol takes the place of one of the equivalents of hydrogen in water. A chemist would express the names of the elements composing the water and spirit by the first letters of their names, and add their equivalents by figures attached to the letters. "Thus his symbol for water would be H_2O; for the radical ethyl, C_2H_5; and for alcohol (C_2H_5), HO or C_2H_6O." While on this subject it may be proper to remark that alcohol is the name of a genus rather than a species. In addition to the common or ethylic alcohol, the chemist has discovered methylic, propylic, butylic, amylic, and other alcohols, varying in their elementary composition, and consequently differing in their character. The practical bearing of this fact will be noticed elsewhere; at present our attention must be confined to the physiological action and effects of the alcohol already described—spirits of wine.

That alcohol is not a necessary article of diet is abundantly proved both by the experience of man and the lower animals. The human frame has been proved capable of enduring the most severe toil and extreme exposure without loss of bodily vigour when no other drink was obtainable than water. But we go further than this, and assert not only that alcohol is unnecessary for food, it is not food at all. It is now commonly recognised that food must nourish the blood, and the organs and tissues formed out of it by supplying the materials out of which they are composed. But alcohol does not contain the constituent elements of the body in any available form, and cannot therefore build it up. It has neither phosphorus nor lime for the bones, iron or salts for the blood, or albumen, which is the basis of every living organization. Those who say that because it contains carbon, oxygen, and hydrogen—which are elements of the body—it will supply their waste, only reveal their ignorance of the first principles of vital chemistry. "Animals," says Dr. Lees, "cannot feed upon gas, or appropriate charcoal; *that* is the peculiar function of the vegetable, the appointed organism for preparing the food of man."

What are called foods are divisable into two great classes: those which supply material or tissue, and those which furnish heat or other variety of force. Chemists have ascertained that all building foods contain the element nitrogen as an essential part; the force-supplying foods are free of nitrogen, and are hydro-carbons—substances that will undergo combustion by oxidation, and liberate force for the motive uses of the economy. The sharp classification of foods as nitrogenous or tissue-feeding, and respiratory, or heat-producing, is undergoing some modification, through the discovery that the nitrogenous are in some degree heat-producing; but this does not in any way affect the practical question.

The nitrogenous foods exist in the animal body in what is called colloidal matter. In its purest form this colloid is found in the blood. Of it the moving muscles are formed. In a fluid state the albumen called colloid forms part of the organic structure. Under different names a nitrogenous colloidal substance forms the organic matter of the skeleton, the cartilages, sheaths of muscles, membranes, &c., so that it may be said all the active masses of structure are nitrogenous and colloidal. Two other material ingredients in combination with this active matter are water and saline substance. The activity of the colloid depends upon its combination with water, and the various kinds of this combination depends upon the saline. In bones the gelatine is combined with phosphate of lime, carbonate of lime, and other salts in larger proportion than itself. In fibrine the colloid is nearly divested of saline matter, but in all parts these three compounds make up the animal structures. Outside these structures is one other animal product, viz., fat, a substance detrimental to motion when in excess, but at the same time capable of combustion, and of yielding heat by the process.

These are the constructive or building parts of the body. "Excepting the water, the salts, and the fat, they all contain nitrogen, and they take their specific quality from that specific fact. We know that the source of them is the vegetable kingdom, that they are formed by nature in that kingdom, are transferred from the vegetable to the animal, are not made by any natural process within the animal, have not yet been made by any artificial process known to the chemist, and can therefore only be supplied from the one natural supply.

"*Alcohol contains no nitrogen, it has none of the qualities of these structure-building foods; it is incapable of being transformed into any of them; it is therefore not a food in the sense of its being a constructive agent in the building up of the body.*"

Opinions differ somewhat as to the fat-producing power of alcohol. It is known that starchy matter is transformable into sugar, and believed that sugar will produce fat. It is also clear that alcohol can be obtained from sugar, but not at all certain that the reverse process is possible. Alcoholic persons sometimes undergo fatty degeneration of the heart and other muscles, apparently resulting from an interference with the nutritive process, which involves the imperfect elimination of waste material and the deposit of fatty tissue in improper places. All this militates against the supposition that fatty matter is obtained direct from alcohol, and leads to the conclusion that its accumulation in the case of alcoholics is an injury and a disease. Dr. Richardson's conviction is that alcohol "probably does not produce fatty matter except by an indirect and injurious interference with the natural processes. It certainly does not help to build up the active nitrogenous structures."

Driven from the field as a tissue-feeding material, alcohol asserts its claims as a heat-producing food. It is known that it will burn, and it was long believed that it would combine with more oxygen when carried by the circulation to the lungs, thus increasing the vital heat and augmenting the animal force. For a length of time therefore the dictum of Liebig, who classed alcohol with heat-producers, was generally accepted, and it was supposed that the warm glow which follows its introduction to the system corroborated the theory. This supposition has, however, been completely overthrown by the researches of the eminent French Professors Lallemand and Perrin, who, assisted by the chemist Duroy, brought it to the test of actual experiment. Their examination failed to reveal the existence of any of the secondary products of the oxidation of alcohol in the living body. They found that it accumulated in the tissues, especially in the liver and brain, and was eliminated by the fluid secretions as alcohol still unchanged. Their conclusion was that the animal organism refused to make use of alcohol in any way, and rejected it by all the organs of elimination as fast as possible. Subsequent investigations by the lamented Dr. Anstie and others have somewhat modified these conclusions, but without weakening the case against alcohol. It is found by conclusive evidence that not all the alcohol is ever eliminated, but that a large proportion is decomposed in the body. The question therefore recurs, What becomes of it? Does it supply heat and generate force? If so, that force must be recognisable in the increase of animal heat, and the product of its combustion (carbonic acid) be discovered in the excretions. Happily for the cause of temperance, a complete answer can be furnished to the question. Dr. Anstie says that the amount of alcohol which can be disposed of daily within the organism of an adult male is capable (theoretically) "of generating an enormous amount of force, but it is equally certain that that force does not show itself under the form of heat."

In the course of some researches he had to make for reports rendered to the British Association for the Advancement of Science, Dr. Richardson had to observe the effect of alcohol and other chemicals on the animal temperature. He entered on the investigation without any predisposition on either side. The experiments were conducted without regard to comparison or result, and the research lasted over three years. The facts obtained he has epitomised as follows :—

"The progressive stages of change of animal function from alcohol are four in number. The first is a stage of excitement, when there exists that relaxation and injection of the blood vessels of the minute circulation with which we have become conversant. The second is the stage of excitement with some muscular inability and deficient automatic control. The third is a stage of rambling incoherent, emotional excitement, with loss of voluntary muscular power, and ending in helpless unconsciousness. The fourth and final stage is that in which the heat itself begins to fail, and in which death, in extreme instances of intoxication, closes the scene. These stages are developed in all the warm-blooded animals, and the changes of temperature throughout the whole are relatively the same.

"In the first stage the external temperature of the body is raised. In birds—pigeons—the rise may amount to a full degree, on Fahrenheit's scale; in mammals it rarely exceeds half a degree. In man it may rise to half a degree, and in the confirmed inebriate, in whom the cutaneous vessels are readily engorged, I have seen it run up to a degree and a-half. In this stage the effect on the extremities of the nerves is that of a warm glow, like what is experienced during the reaction from cold.

"The heat felt in this stage might be considered as due to the combustion of the alcohol: it is not so; it is in truth a process of cooling. It is from the unfolding of the larger sheet of warm blood and from the quicker radiation of heat from that larger surface. During this stage, which is comparatively brief, the internal temperature is declining; the expired air from the lungs is indicating, not an increase but the first period of reduction in the amount of carbonic acid, and the reddened surface of the body is so reduced in tonicity that cold applied to it increases the suffusion. It is this most deceptive stage that led the older observers into the error that alcohol warms the body.

"In the second stage the temperature at first comes down to its natural standard, and then declines below what is natural. The fall is not considerable. In birds it reaches from one and a half to two degrees. In other animals, dogs and guinea pigs, it rarely exceeds one degree; in man it is confined to three-fourths of a degree. In a room heated to sixty-five degrees or seventy degrees the decrease of actual temperature may not be perceived, but it is quickly detected if the person pass into a colder atmosphere, and it lasts, even when the further supply of alcohol is cut off, for a long period, viz., from two and a half to three hours. It is much prolonged by the absence of food.

"During the third degree the fall of temperature rapidly increases, and as the fourth stage is approached it reaches a decline that becomes absolutely dangerous. In birds the reduction may be five degrees and a half, and in the other animals three. In man it is often from two and a half to three degrees. There is always during this stage a profound sleep or coma, and while this lasts the temperature continues reduced.

"It is here worthy of incidental notice that as a rule the sleep of apoplexy and the sleep of drunkenness may be distinguished by a marked difference in the animal temperature. In apoplexy the temperature of the body is above, in drunkenness below, the natural standard of ninety-eight degrees of Fahrenheits's scale.

"Under favourable circumstances a long period is required before the body recovers its natural warmth after such reduction of heat as follows the extreme stage of alcoholic intoxication. With the first conscious movements of recovery there is a faint rise, but such is the depression that these very movements exhaust and lead to a further reduction. I have known as long a period as three days required, in man, to bring back a steady natural return of the full animal warmth.

"Through every stage, then, of the action of alcohol—barring that first stage of excitement—I found a reduction of animal heat to be the special action of the poison. To make the research more perfectly reliable, I combined the action of alcohol with that of cold. A warm-blooded animal insensibly asleep in the third stage of alcoholic narcotism was placed in a chamber, the air of which was reduced in temperature to ten degrees below freezing point, together with another similar animal which had received no alcohol. I found that both sleep under these circumstances, but the alcoholic sleeps to die; the other sleeps more deeply than is natural, and lives so long as the store of food it is charged with continues to support life. Within this bound it awakes, in a warmer air, uninjured, though the degree of cold be carried even lower, and be continued for a longer time.

"One more portion of evidence completes the research on the influence of alcohol on the animal temperature. As there is a decrease of temperature from alcohol, so there is proportionately a decrease in the amount of the natural products of the combustion of the body. The quantity of carbonic acid exhaled by the breath is proportionately diminished with the decline of the animal heat. In the extreme stage of alcoholic insensibility—short of the actually dangerous—the amount of carbonic acid exhaled by the animal and given off into the chamber I constructed for the purposes of observation was reduced to one-third below the natural standard. On the human subject in this stage of insensibility the quantity of carbonic acid exhaled has not been measured. But in the earlier stage of alcoholic derangement of function the exhaled gas was measured with much care by a very earnest worker, whose recent death we have also to deplore, Dr. Edward Smith. In these early stages Dr.

Smith found that the amount of carbonic acid was reduced in man, as I have found it in the lower animals, so that the fact of the general reduction may be considered as established beyond disputation.

"We are landed then at last on this basis of knowledge. An agent that will burn and give forth heat and product of combustion outside the body, and which is obviously decomposed within the body, reduces the animal temperature, and prevents the yield of so much product of combustion as is actually necessary to the organic life.

"What is the inference? The inference is *that alcohol is not burned after the manner of a food which supports animal combustion; but that it is decomposed into secondary products, by oxidation, at the expense of the oxygen which ought to be applied for the natural heating of the body.*

"For some time to come the physiological world will be studiously intent on the discovery of the mode by which alcohol is removed from the organism. It is a subject on which I shall one day be able to speak, I hope, with some degree of experimental certainty, but on which at this moment I am not prepared to offer more than an indication of the probable course of research. I may venture to add in advance, two or three suggestions to which my researches, as far as they go, point.

"Firstly—I believe there is a certain determinable degree of saturation of the blood with alcohol, within which degree all the alcohol is disposed of by its decomposition. Beyond that degree the oxidation is arrested, and then there is an accumulation of alcohol, with voidance of it in the unchanged state in the secretions.

"Secondly—The change or decomposition of the alcohol in its course through the minute circulation, in which it is transformed, is not into carbonic acid and water, as though it were burned, but into a new soluble chemical substance, probably aldehyde, which returns by the veins into the great channels of the circulation.

"Thirdly—I think I have made out that there is an outlet for the alcohol, or for the fluid product of its decomposition, into the alimentary canal, through the secretion of the liver. Thrown into the canal it is, I believe, subjected there to further oxidation, is in fact oxidised by a process of fermentation attended with the active development of gaseous substances. From this surface the oxidised product is in turn re-absorbed in great part, and carried into the circulation, and is disposed of by combination with bases, or by further oxidation.

"Here, however, I leave the theoretical point to revert to the practical, and the practical is this; that *alcohol cannot by any ingenuity of excuse for it be classified a mongst the foods of man. It neither supplies matter for construction nor for heat. On the contrary, it injures construction, and it reduces temperature.*"

This is conclusive, and comment is unnecessary; but there are some other points to which brief attention must be given. It is sometimes believed that alcoholic liquors increase muscular power. The test of experiment is decisive in its negative to this opinion. Muscular *excitement* is produced by the action of alcohol on the nerves, but muscular *strength* is not increased in the slightest degree. On the contrary, it is certain that all animals subjected to this influence speedily lose both muscular control and power. Were the case otherwise, it might be worth while administering it to our beasts of burden, but were they plied with intoxicating drink as human workers dose themselves, we should soon find them both untameable and unworkable.

Alcohol is frequently used as a condiment, in the belief that it aids digestion. Few prejudices are more general than this, but, at least in the case of the healthy, it is utterly groundless. It may sometimes be useful to persons of weak and impaired digestive powers, by whom, however, it ought to be regarded as physic rather than food, and used with corresponding precautions. Taken freely and habitually, it is poison rather than aliment. The stomach hates it, and neglects its proper functions to expel the unwelcome intruder. It is greedy of water, and a powerful antiseptic, both of which qualities enable it to retard the digestive process. If by its presence the stomach is excited to do more work than the system requires, the whole equipoise of health is upset. Dr. Cheyne says:—"The hurt and damage which all fermented liquors do an animal body is evident from many considerations; as that they harden, constrict, and bind up the fibres, and strongly unite the particles of animal substances, so that they are with much greater difficulty separated and divided, *i.e.*, digested. A piece of meat will continue sweet and sound for many years in wine and strong beer, or any strong fermented liquor, the liquor (or alcohol in it) cementing, or pinning together, the parts of the meat; and the same happens when they are mixed in the stomach, by which the digestibility and easy dissolution of it is obstructed; so that in such a mixture mutton (which is easiest of digestion) is turned into beef (which is less so), and beef into shoe-leather." Dr. R. D. Thomson, of Glasgow, mentions as a remarkable fact in connection with the gastric juice that alcohol when added to the digestive fluid produces a white precipitate, and that the fluid is no longer capable of digesting either animal or vegetable matter. The result of this disarrangement is frequently dyspepsia—the very malady which it is designed to correct.

Closely allied to this pernicious and mistaken habit is that of taking wine or other stimulant in order to secure an appetite for solid food. The wine drinker excuses his partiality by the remark, "If it is not food itself, it enables me to eat." Probably this is true, yet not at all because wine is essential for that purpose. If the appetite is abnormally low, other and safer means may be employed for raising its tone. A physician will be a cheaper and better friend than the wine merchant, and probably if he dare venture to be candid will say that in this, as in the former case, the evil is propagating itself, the supposed remedy being the real injury.

The whole case against alcohol is admirably summed up by Dr. Richardson in a speech delivered in Exeter Hall. After describing the circumstances which led to his making the subject a special study, and which were entirely unconnected with the temperance movement in any of its forms, he proceeded thus:—"And so I took alcohol from the shelf of my laboratory as I might any other drug or chemical there, and I asked in the course of experiments extending over a lengthened period, What do you do? I asked it, Do you warm the animal body when you are taken into it? The reply came invariably, 'I do not, except in the mere flush of surface excitement. There is, in fact, no warming, but on the contrary an effect of cooling and chilling the body.' Then I turn round to it in another direction, and ask it, Do you give muscular strength? I test it by the most rigid analysis and experiment I can adopt. I test muscular power under the influence of it in various forms and degrees, and its reply is, 'I give no muscular strength.' I turn to its effect upon the organs of the body, and find that while it expedites the heart's action, it reduces tonicity; and turning to the nervous system I find the same reply, that is to say, I find the nervous system more quickly worn out under the influence of this agent than if none of it is taken at all. I ask it, Can you build up any of the tissues of the body? The answer is again in the negative, 'I build nothing. If I do anything, I add fatty matter to the body, but that is a destructive agent, piercing the tissues, destroying their powers, and making them less active for their work.' Finally I sum it all up. I find it to be an agent that gives no strength, that reduces the tone of the blood-vessels and the heart, that reduces the nervous power, that builds up no tissue, can be of no use to me or any other animal as a substance for food. On that side of the question my mind is made up—that this agent in the most moderate quantity is perfectly useless for any of the conditions of life to which men are subjected, except under the most exceptional conditions which none but skilled observers can declare."

Were it necessary or desirable a host of eminent authorities might be summoned to corroborate the statement that as food alcohol is absolutely worthless. Space will only admit of a few quotations, and they must be not only apposite, but as brief as possible. The veteran Baron von Liebig may appropriately introduce the series. He says:—"Beer, wine, spirits, &c., furnish no element capable of entering into the composition of blood, muscular fibre, or any part which is the seat of the vital principle—('Letters on Chemistry,' 1844)." And again:—"The circulation will appear accelerated at the expense of the force available for voluntary motion, but without the production of a greater amount of mechanical force." "The use of wine is quite superfluous to man; for though it be not always injurious to health, yet it is constantly followed by the expenditure of power."

Dr. Edward Smith, F.R.S., after performing a series of experiments in 1859, which are recorded in the Philosophical Transactions, arrived at the following conclusions:—"(1.) Alcohol is probably not transformed, and does not increase the production of heat by its own chemical action. (2.) It interferes with alimentation. Its power to lessen the salivary secretions must impede the due digestion of starch. (3.) It greatly lessens muscular tone and power. (4.) Alcohol is not a true food; and it neither warms nor sustains the body by the elements of which it is composed."

The general conclusion arrived at by Lallemand, Perrin, and Duroy, is thus expressed:—"Facts establish, from a physiological point of view, a line of demarcation between alcohol and foods. These latter restore the forces without the organism betraying, by disturbed function or by outward agitation, the labour of repair, which is accomplished silently in the woof of the tissues. Alcohol, on the other hand, immediately provokes, even in a moderate dose, an excitement which extends through the entire economy."

Even Dr. Anstie, who entered the field as an opponent of the learned Frenchmen, gives similarly negative testimony, and places alcohol in decidedly disreputable company. He says:—"There are a number of substances of which we are not able to prove that they are either used for the repair of the tissues, or transformed in the body so as to generate heat; in this class we place *Alcohol*, Chloroform, the Æthers, various alkaloids, *Strychnia*, *Morphia*, and the vegetables which contain them."

The *British Medical Journal*, in a leading article published on the 9th of September, 1865, under the heading "Is Alcohol Food?" after reviewing the discussion on this subject, "feels bound to say that on the face of it the teetotallers have, from a scientific point of view, the best of the argument. It is certain, for example, that our greatest and most esteemed authorities in the matter of dietetics have come to the conclusion that alcohol is not food; that it is not assimilated; that it does not undergo decomposition within the body, but on the contrary, is eliminated as alcohol from the body. The body, in truth, seems to have a very decided antagonism to alcohol—regards it, we might say, as a very dangerous enemy, for as soon as ever spirits of wine or alcohol has found its way into man, his eliminating organs, every one of them, are called into operation for the very purpose of dislodging the unwelcome stranger."

It is characteristic of those who make the noble science of medicine their study, that as soon as an error is clearly discovered they generally have the frankness to avow it, even though the erroneous opinion may be venerable with age and authoritative with the sanction of famous names. The advancing light of science is eagerly welcomed and its teachings willingly heard. At various times declarations have been made by large numbers of medical men, and the support of the medical fraternity as a whole may now be claimed as definitely given to the side of temperance reform. Testimonies similar to the foregoing might be multiplied indefinitely did the argument need further support, but they are not required. The series which begins with the honoured name of the distinguished German chemist, may be fittingly ended by a confession from Sir Astley Cooper, than whom few men have more right to speak in the name of the profession to which he belonged. His avowal is decided and manly—"We have all been mistaken in these things, we have considered them as restoratives and nutritious; we now find that they are merely stimulants."

Lest any lingering doubt should remain in the minds of any who, convinced at length that alcohol is useless, cling to the thought that the solids which wine and other liquors hold in solution have considerable nutritive value, it is necessary to remark that this solid matter is as poor in quality as it is insignificant in quantity. It is notorious that malt liquors concontain proportionately far more nourishment than wine or spirits; and yet Baron Liebig says "730 gallons of the best Bavarian beer contain exactly as much nourishment as a five-pound loaf or three pounds of beef." Champagne contains far more solids than any other commonly used wine, and about twice as much as port, but five-sixths of these are sugar, which can be obtained quite as good at a fractional part of the cost. It is calculated that half a pint of what is considered the best wine in the market would not contain fifty grains of flesh-forming matter. The minute portion of nourishing matter contained in a glass of wine may easily be ascertained. Let the reader evaporate a glass of it on a plate; whatever solid matter it contains will be left, and can be gathered when dry on the point of a penknife. The portion of it which is capable of nourishing the body will probably be about equal to one-third of a grain of wheat!

The position assumed at the outset may now be regarded as fully established. The solids in wine are so minute and valueless as to be unworthy of serious consideration. Alcohol occupies the chief place both with regard to its chemical character and popular use. Postponing for the present the question of its harmfulness, it has been shown to be utterly worthless as an article of diet. It neither supplies nourishment nor force. It has been fairly tried, and the verdict that alcohol is not food, and that therefore on this ground alcoholic wine can have no claim to be regarded as an article of diet, is confirmed by the consentaneous voice of a host of learned, impartial, and competent judges.

CHAPTER II.

Alcohol a Poison.

Positively injurious—Diseases directly induced—A catalogue of horrors—Its effects on principal organs—The stomach—The blood—The brain and nerves—(Intoxication poisoning)—Spinal cord and nervous system—Blood vessels and heart—Mechanical disturbance—Structural derangement—Other organs—Mucous membranes—Liver, Kidneys, and Skin—Summary.

Having examined the claim of alcohol to be regarded as useful for food, and ascertained it to be without foundation, we are now prepared to take a forward step and see whether it is as harmless as it is useless. It is sometimes alleged that if alcoholic drinks are not nourishing and necessary they are at all events allowable and innocent. The foe cannot be allowed to retain even this secondary position, and there will not be any serious difficulty in effecting his dislodgment. The assertion that alcoholic stimulants are harmless is met at once by the counter-assertion that their chief ingredient is a deadly poison. However disguised and concealed, it is a poison still. Like other poisons, it has its uses, and may sometimes be employed medicinally with advantage; but like them, its place is in the medicine-chest and not on the dinner-table. People who habitually drug themselves notoriously injure health, and not unfrequently shorten their lives; but alcohol is more powerful than most drugs, and its effects are in proportion to its power. The accusation levelled against alcohol is not merely that excessive indulgence in it is bad—every one admits that—but that the thing itself is bad; its use is always attended with danger. As a beverage it is positively injurious to health, whether taken habitually or occasionally, in large quantities or small.

The diseases directly induced by alcohol are numerous and fearful. The following are a few of them, arranged alphabetically:—

Apoplexy
Cerebral Disease
Cirrhosis of Liver
Consumption
Delirium Tremens
Diseases of Heart and Arteries
Diseases of Skin (numerous)
Disorders of Mucous Membranes
Dropsy
Dipsomania
Fatty Degeneration
Gastric Dyspepsia
Gout
Insanity
Inflammation of Liver
Inflammation of Brain
Indigestion
Kidneys, Diseases of
Loss of Appetite
Meningitis
Mental Debility in Offspring
Paralysis
Physical Deterioration
Premature Decay

But these are not all. Many of the above, as will be seen, are groups of diseases, and the list might be greatly lengthened. Dr. Grindrod enumerates no fewer than 88 diseases of which alcohol is the direct cause. The records of hospitals and lunatic asylums show how large a proportion of the misery and suffering witnessed there flow from this solitary source. The verdicts of coroners' juries and the reports of serious casualties and sudden deaths to be met with almost daily, add their testimony to its destructive power.

Our observations may take a yet wider range, and the more we study the field of its operations the more sickening become the evidences of its terrible character. Could the details be imagined of the accidents occurring under its influence, the criminal offences committed at its bidding, the vessels wrecked, the dwellings burned, the wealth squandered, the destitution involved, the homes desolated, the cruelty wreaked, the idleness engendered, the ignorance fostered, the health wasted, the physical strength enfeebled, the mental power destroyed, the moral sensibility blunted, the religious declension necessitated, the blasphemy uttered, the recklessness developed, the poverty occasioned, the pauperism perpetuated, the wives and children abandoned, the chastity trodden under the heel of brutality, the prostitution practised for the price of a dram, the imbecility, idiotcy, and madness which often fastens upon its slave, and is, alas! transmitted to his innocent children; the strife and bloodshed, manslaughter, murder, and other deeds of violence for which it is responsible; could all these horrors be gathered into one view grouped around the vile enchanter whose handiwork they are—and were there added as a background to the picture the millions of his victims slain prematurely by his poisonous breath, with the gaping gulf of Tartarus, which is being crowded with his hapless prey—the demon of strong drink would seem to stand like the unveiled Prophet of Khorassan, and might say with him:—

> "Here—judge if hell, with all its power to damn,
> Can add one curse to the foul thing I am!"

Forced to admit that the captivating adornment of their dinner-tables is the worst poison in the pharmacopœia, wine drinkers endeavour to escape the application of the truth by an attempt to discriminate between indulgence and excess. "A glass of wine does me good," says one; "it is only injurious to those who do not know when to stop." The assertion must not be allowed to pass unchallenged. It will be necessary in order to expose its fallacy to see what effect alcohol produces on the principal organs of the body, and their leading functions. This will prove how greatly self-styled moderate drinkers are mistaken and deceived.

As the stomach is the receptacle for all food and drink, and is therefore first acted upon by the poison, we may begin by considering how it is affected. Fortunately, we are not left to sensation or conjecture. The famous case of Alexis St. Martin supplied the means of ascertaining exactly how alcohol acts on the stomach. The careful observations of Dr. Beaumont have long been before the world, and their accuracy is undisputed. With the evident changes in the coating of the stomach caused by alcohol most people are tolerably familiar, and few care to think they are the subjects of similar injury. The function of the stomach is digestion of the food with which it is charged. This is effected by trituration of its contents, and the solvent action of the gastric juice. Alcohol directly interferes with both of these operations. Its property of coagulating albuminous substances is well known, and in this instance it throws down the pepsine from the digestvie fluid, thereby rendering it utterly powerless. Were it not that it is rapidly absorbed, digestion would never be accomplished, as the pepsine would be precipitated as fast as it was produced. Before absorption can take place, however, the alcohol must be diluted, "for there is this peculiarity respecting alcohol when it is separated by an animal membrane from a watery fluid like the blood, that it will not pass through the membrane until it has become charged, to a given point, with water. It is itself, in fact, so greedy for water, that it will pick it up from watery textures, and deprive them of it, until by its saturation its power of reception is exhausted, after which it will diffuse itself into the current of the circulating fluid." At the same time the absorbent vessels of the membrane are seized upon by the potent spirit, and diverted from their proper use, so that in several ways the functions of this important organ are abused and disarranged. Unable to absorb the food which it may imperfectly digest, and also unable to produce in proper quantity the natural digestive fluid, it is in constant uneasiness and irritation. It is oppressed with a sense of nausea, and of emptiness and prostration, with a feeling of distension, and with a loathing for food, while it is teased with a craving for more drink. Thus a permanent disorder is often engendered, which is politely termed dyspepsia, and for which different remedies are often sought, but never found. Antibilious pills, seidlitz powders, effervescing waters, "and all that pharmacopœia of aids to further indigestion in which the afflicted, who nurse their own diseases so liberally and innocently indulge, are tried in vain." Many of the worst forms of confirmed indigestion originate in the practice which is thus explained. The proper fluid aid to digestion, solvent for food and tonic for the stomach, is water. "It is through the medium of the water contained in the animal body," says Dr. Carpenter, "that all its vital functions are carried on. No other liquid than water can act as the solvent for the various articles of food which are taken into the stomach." Water dissolves them there; water carries them into the blood, and through the frame; and water helps to work them off again when useless; but alcohol does the very reverse of all this, for it tends to harden and coagulate rather than to soften and dissolve.

Only a small portion of the alcohol taken into the stomach is decomposed there, and the bulk immediately finds it way into the circulation. The greater part "is absorbed direct by the veins of the alimentary surface, finds its way straight into the larger veins which lead up to the heart, and onward with the course of the blood. Another portion is picked up by those small structures which proceed from below the mucous surface of the stomach, which are called *villi*, and from which originate a series of fine tubes that reach at last the lower portion of a common tube known as the thoracic duct, the tube which ascends in front of the spinal column, and terminates at the junction of two large veins on the left side of the body, at a point where the venous blood, returning from the left arm, joins with the returning blood from the left side of the head on its way to the heart." Its effect on the blood vessels is to cause increased excitement, and also contraction of their diameters. This, again, leads to enlargement in some parts, and effusion, should their coats give way. Diseased deposits are also liable to be formed at the branches or in the wider parts of the vessels, giving rise to painful symptoms, such as those of gout and rheumatism.

On the blood alcohol produces seriously prejudicial effects. If the constituents of blood be examined, it is found to contain about seven hundred and ninety parts in a thousand of water. Besides this there are about two or three parts of fibrine—the plastic substance which clots and coagulates when blood is drawn—ten parts of salts, and seventy parts of albumen. There are also fatty matters, and myriads of the white and red blood globules or corpuscles which perform so important a part in the animal economy. The red corpuscles, as is well ascertained, are the vital instruments of circulation. They absorb in great part the carbonic acid produced in the combustion of the body in the extreme tissues, convey it to the lungs to be exchanged for oxygen, which they carry back to the tissues. Diffused through the water and brought into contact with the other parts of the blood, alcohol exercises disturbing action upon all of them. On the corpuscles its action is varied, sometimes it causes them to adhere, and at others to change their outline. It impairs their ability to fix gases, and when they are massed together, as they pass less easily through the minute vessels of the lungs, the current is impeded and local injury produced. It also affects the fibrine, either by extracting the water so as to produce coagulation, or by fixing the water with it, destroying the power of coagulation. Thus in various ways the blood becomes unfit for healthy nutrition. It is sometimes so loaded with fat that particles of this become visible to the naked eye, floating as brilliant points. Unable to dispose of the waste material it carries, it assumes too much of the venous character, and is, in ordinary language, corrupted and poisoned. Evidences of this are plain upon the surface to those who have ever noticed the flabby tissues or the unhealthy complexion of a drunkard, which shows—to use a popular expression—that "his blood is out of order." As the blood is the life, whatever renders it impure devitalises and deteriorates the whole animal economy.

The action of alcohol is equally prompt, and its effects on the brain and nervous system more conspicuous, than they are on the blood. This circumstance is constantly referred to in the homely description of strong liquor as "heady," and the complaint of many an inebriate that the wine "got into his head." It does, literally. Shakespeare indicates this peculiarity of alcoholic action with his wonted precision in the self-reproachful words of Cassio—"I remember a mess of things, but nothing distinctly; a quarrel, but nothing wherefore. O that men should put an enemy in their mouths *to steal away their brains.*"

Poisons affect different organs, and operate in different ways, according to laws of their own. Instead of being universally and equally diffused throughout the system, as might be expected, certain poisons appear to be drawn to certain parts as if by a magnetic attraction. Of many toxicological laws the chemist knows little more than that they exist. Although he cannot tell why it is so, he knows as a matter of fact that some poisons act specially on the heart, others on the bowels, the mucous membrane, the kidneys, the glands. He knows for instance that strychnine acts primarily and chiefly on the spinal cord; alcohol, opium, and all narcotics on the brain.

When once alcohol gains access to the body, it dashes at the brain, forcing through every obstacle and finding its way by every channel, like some ruthless murderer intent upon his victim, and guided by a kind of infernal intelligence. How rapidly it seizes its object may be gathered from an experiment made by Dr. Percy. He injected about two ounces and a half of alcohol into the stomach of a dog. The animal dropped dead almost instantaneously, and Dr. Percy immediately removed the brain and placed it in an apparatus for distillation. The whole operation was only the work of a few minutes, and yet he obtained from the brain a greater quantity of alcohol than from an equal weight of any other part of the body, or even the blood itself.

The eagerness alcohol manifests to obtain dominion over the noblest part of man, the throne of his reason, and the organ of his will, is seen by the fact that it is found there more abundantly even than in the fluid by which the brain is nourished. Dr. Percy says that although he had subjected to analysis a much greater quantity of blood than could possibly be present within the cranium, yet he had in general been able to procure a much larger proportion of alcohol from the brain than from all that quantity of blood. "Indeed it would seem that a kind of affinity exists between alcohol and the cerebral matter." Dr. Richardson's description of a drunkard's brain ought to operate as a solemn warning. He once had the opportunity of seeing the brain of a man who in drunken madness decapitated himself under the wheel of a railway carriage, and which being instantly evolved from the skull by the crash, was before him within three minutes afterwards. He says:—"It exhaled the odour of spirit most distinctly, and its membranes and minute structures were vascular in the extreme. It looked as if it had been recently injected with vermillion. The white matter of the cerebrum, studded with red points, could scarcely be distinguished, when it was incised, by its natural whiteness; and the piameter, or internal vascular membrane covering the brain, resembled a delicate web of coagulated red blood, so densely were its fine vessels engorged."

A large dose of alcohol has been known to kill almost instantaneously. A man, for a wager perhaps, quaffs a large draught of brandy, tumbles down and dies on the spot. The shock to his nervous system has acted like a blow on the head or a kick on the stomach. The poison, as in the case of Dr. Percy's spaniel, has acted with the fatal promptitude and power of prussic acid. *Post-mortem* examinations in such cases have often disclosed the brain soft and saturated with the poison, which has retained its peculiar odour, and burned with the usual blue flame of spirits, as though the brain were its special destination.

Death results from alcoholic poisoning by coma as well as by shock. Professor Miller describes the case of a gentleman who supped out, drank several tumblers of toddy, came home, and went to bed. In the morning he was found insensible. A physician, hurriedly called, at once recognised the symptoms as those of narcotic poisoning, and treated the patient accordingly. Reaction began, but failed, and death occurred within a few hours. On dissection, no organic lesion or other cause of death could be detected. The contents of the stomach were carefully secured, and made over to the care of a skilful chemist. Morphia was suspected, but nothing could be found—save alcohol. In this there was not even inebriation in the sense in which the word is sometimes used, but there was true intoxication; congestive apoplexy was caused, and the patient was poisoned.

By its influence on the brain alcohol does more than slay its victim; it consigns him to a living tomb. The various forms of mental disease which it occasions are, unhappily, too well known to need detailed description. Repeated acts of indulgence result in that soddening of the brain which produces utter imbecility and presents one of the most painful spectacles to be seen. Dipsomania is another of its evil issues in which the craving for alcoholic stimulants is a madness, and all but irresistible. Gough's terrible words describing this condition have often been repeated:—"If a bottle of brandy stood at one end of the table, and the pit of hell yawned at the other, and I were convinced that if I took but one glass I should be pushed in, I could not refrain." Delirium tremens with its inferno of horrors, exceeding all that Dante ever described or Doré painted, is the fearful foreshadowing of his possible future who yields himself to the power of wine. These are but a few of the mental maladies with which those who have to do with cerebral diseases are familiar as direct results of the action of alcohol on the brain.

Intoxication is without doubt the commonest form of alcoholic poisoning. Let not the reader object to the expression that man may be so far under the influence of liquor as to justify the epithets commonly applied, and for which it is difficult to find an equivalent which is scientifically exact—such as "elevated" or "screwed," "tipsy" or "glorious"—and yet not be poisoned. The verb to intoxicate is derived from the Latin *toxicum*, and etymologically simply means to poison. The ethereal exhilaration of spirits produced by drinking wine, the exalted generosity of feeling, the extra-cordiality of sentiment which leads chance acquaintances to swear eternal friendship, the enlivening of the imagination, brilliancy of wit, and genial glow which pervades the whole being, what are these but signs of incipient intoxication? Substitute for the last word another which is its legitimate equivalent, and they are symptoms of incipient poisoning.

How certainly and quickly alcohol acts on the brain and nervous system is seen every day. The thickened speech in which the *convive* declares he is not drunk, "norabirofit," and he "wogohotir-morrir," declares surely that the nervous control of his organs of articulation is suspended. The same cause accounts for his trembling hands, quivering lip, and uncertain footsteps. These visible signs of nervous disorder are tokens of what is going on in the way of functional derangement over the whole system. They can be produced, in some degree, by a comparatively small quantity of the subtle poison, and are Nature's signal of distress indicating the damage which is being done. They may be regarded as her indignant protest against the violence she endures, and the headache, with other painful consequences of violating her laws which follows them, as the evidence of her resentment. The thoughtless may laugh at the ludicrous exhibition, and the moralist may frown, but the physiologist who does neither sees that it is a condition of functional disease, muscular power being partially freed from nervous control.

The action of alcohol on the spinal cord and the nervous system of which it forms so important a part, requires to be specifically noticed. It is through this part of our organization that we are accustomed to perform mechanical acts which proceed automatically while the mind is engaged with other and totally different subjects. Thus a workman will continue his mechanical work without consciously exercising the higher brain-centres, unless some special occasion requires him to call in their aid, and he needs to think before acting. Walking is one of these mechanical acts which is ordinarily done without thought and yet correctly; when, however, the spinal centres become influenced by alcohol, pure automatic acts of this kind cease to be correctly carried on. That the course may be kept straight and the foot planted safely, the higher intellectual nature has to be called in to effect the object. A deficient power of co-ordination of muscular movement quickly follows, nervous stimulus is enfeebled, and control lost. The muscles of the lower lip in the human subject usually fail first, then those of the lower limbs, and as the muscles generally come under the influence of the paralysing agent, their structure is temporarily deranged, and their contractile power reduced.

Thus the action of alcohol on the spinal cord and nerves is first exhibited by its effect on involuntary motion, or rather motion that is performed without any special exercise of volition; but if it is carried further it seizes the higher functions of will, judgment, and reason. "The rational part of man gives way before the emotional, passional, or organic part. The reason is now off duty, or fooling with duty, and all the mere animal instincts are laid atrociously bare. The coward shows up more craven, the braggart more boastful, the cruel more merciless, the untruthful more false, the carnal more degraded. *In vino veritas* expresses even indeed to physiological accuracy the true condition. The reason, the emotions, the instincts, are all in a state of chaotic feebleness."

The further and final effect of alcohol on the brain, spinal cord, and nervous system is thus described by Dr. Richardson:—"The action of the alcohol still extending, the superior brain centres are overpowered, the senses are beclouded, the voluntary muscular prostration is perfected, sensibility is lost, and the body lies a mere log, dead by all but one-fourth, on which alone its life hangs. The heart still remains true to its duty, and while it just lives it feeds the breathing power. And so the circulation and the respiration, in the otherwise inert man, keeps the man within the bare domain of life until the poison begins to pass away, and the nervous centres to revive again. It is happy for the inebriate that, as a rule, the brain fails so long before the heart that he has neither the power nor the sense to continue his process of destruction up to the act of death of his circulation. Therefore he lives to die another day."

Closely connected with the injury wrought by alcohol on the nervous system is its effect on the apparatus of circulation and the central fountain of vitality—the heart. Every arterial vessel throughout the body is accompanied by its attendant nerve, which, by its connection with the organic nervous centre, automatically controls its contraction and dilation. This is done without direction from the will, and it follows that when the organic nervous supply is cut off or suspended, the vessels become paralysed, and can offer no resistance to the flowing blood. The flushing of the face and the warm external glow which follows a few glasses of wine or other alcoholic drink results from this cause. A similar effect can be produced by other means. If the vapour of nitrite of amyl, for instance, be inhaled, a red glow will immediately be felt and seen in the face. The action set up is that of paralysis of the nerves which control the minute circulation, and the vessels are immediately injected with blood. The feeling of surface warmth which is so often noticed is produced in this way. When a glass of spirits is taken "to keep out the cold," and a genial glow pervades the frame, what really takes place is this:—The alcohol by its action on the organic nerves paralyses the finer vessels, and allows them to become unhealthily flooded and distended. Both functional and structural derangements are the results of this interference with the order of nature. Even if no marked change immediately result, such a distension and consequent relaxation of the vessels cannot frequently take place without permanent harm. The increasing ruddiness of complexion of an habitual wine or spirit drinker clearly shows this effect of alcohol on his circulation.

But the mischief does not end with derangement of the circulation. With disturbance of power in the extreme vessels, other organs suffer, and the first that feels the effect is the heart. The evils wrought on the heart are of two kinds, functional and structural. The first effect of alcoholic disturbance is purely mechanical. In a state of health a certain degree of resistance is offered by the vessels to each beat of the heart, and thus its stroke is regulated both as to tension and time. But when alcohol relaxes the vessels in the manner we have seen, the resistance is removed, the heart begins to run quicker, like a watch from which the pallets have been removed, and the heart-stroke, losing nothing in force, is greatly increased in frequency, with a weakened recoil stroke. Thus the quickened heart and pulse which are occasioned by the use of stimulants are fully accounted for.

Careful and prolonged experiments have been made with a view of ascertaining the precise extent of this mechanical derangement, and the results are most instructive as well as interesting. The heart of a healthy man makes about 100,000 beats in the course of the twenty-four hours. With each stroke the two ventricles, as they contract, lift into their respective vessels six ounces of blood. A simple calculation shows that the amount of work done by the heart each day is about equal to raising 116 tons one foot from the ground. It is proved by actual experiment that alcohol compels the heart to beat quicker, and so in fact, puts more work upon it, the amount of increased labour varying, of course, with the force and frequency of the stimulus. The quantity of extra toil thus imposed upon the heart of a "moderate drinker" is positively startling. It may be judged by imagining an ordinary case. A man who takes a pint of malt liquor, half a pint of wine, and one or two glasses of spirits during the twenty-four hours, consumes in this way about six ounces of alcohol. That quantity will make his heart beat 18,000 times more than is natural, and the work done will be equivallent to raising nineteen tons one foot from the earth. If it be objected that as the heart in its normal state beats 100,000 times, this is not a severe extra strain to put upon it, the proportion must be noticed, and it will be seen that it amounts to nearly one-sixth of the whole. Let the objector test the amount of work by a single experiment. In nineteen tons there are 7,220 seven-pound weights. Let him choose a convenient position and try to lift such a weight (which is easily handled) one foot high that number of times in the course of a single day. Although his arms are more powerful organs than his heart, he will find that not only they, but his whole body, will be utterly worn out and prostrated before he has completed his task. Yet this is *the mere overwork* which he compels the most laborious organ in his constitution to undertake.

There need not be any surprise that such mechanical disturbance produces manifest results. By the quicker propelling stroke of the heart the vessels throughout the whole of the body are dilated and otherwise injured. When the stimulus is withdrawn there is of necessity a sensation of feebleness and fatigue. The heart cannot sink back to its regular action without evidencing the effects of disturbance, in hesitation and palpitation. Moreover, as it is a self-regulating machine, dependent for its supply upon its stroke, it speedily begins to suffer from deficient nutrition and to undergo deterioration in its structure and mechanism.

The structural changes induced by alcohol are varied. The heart becomes enlarged as the result of extra work, just as do the muscles of a blacksmith's arm or a dancer's leg. Its valvular and other mechanical parts are thrown out of proportion. The orifices through which the tides of life flow in their respective courses become dilated, and the valves become stretched, lose their suppleness and their exquisite adjustment. The muscular tissue of the heart itself is degenerated, and reduced in its power of contraction, and the membranous structures which live in it become thickened, cartilaginous, and even bony. Other organic changes take place which it is needless to particularise, and it is evident that by the damage endured by the governing organ of the circulation the whole framework built upon and sustained by that circulation must be deeply injured.

It is impossible to emphasise too strongly this warning lesson. Warning is needed, for probably no mechanical injury or organic deterioration wrought by alcohol is more insidious than its effect upon the heart. Very few who habituate themselves to the pleasing stimulant will admit the possibility. All they will confess to even when it has fairly set in, is "a sinking," which, however, they know a glass of wine or spirits will remove. It must be repeated that, with every such stimulating draught functional derangement is caused; and, in the course of time the habit of taking alcohol will inevitably produce structural deterioration, although, while the forces of assimulation, secretion, and excretion are in full activity, it may be unperceived.

This outline of the injuries inflicted by alcohol on the principal organs by which the most important natural processes are carried on within the human body—food is assimilated, control exercised, and circulation effected—brief and incomplete though it is, will show that so far from its being useful as food it is a powerful and destructive poison. Nor are these the only organs which suffer. Every part of the body cries out against it. The mucous membranes from the lips downward are irritated by it, and deteriorated in their character. It has a special affinity for the liver as well as for the brain. The experiments of Lallemand and his coadjutors prove that alcohol can actually be found there in large quantities when but little of it pervades the whole body. This organ is peculiarly liable to structural change from its special capacity for holding foreign substances in its cellular parts. The liver of a confirmed tippler is probably never free from alcoholic poison, and the change it causes is of a definite type. At first it is enlarged by the distension of its vessels and thickening of its tissue. Then follows contraction of membrane and shrinking of the whole mass in its cellular parts, producing the appearance which is so expressively termed "hob-nailed." The kidneys do not receive the poison so directly, but it stimulates them to increased activity, and frequently produces the formidable and insidious affection known as "Bright's disease." The skin is constantly employed in removing effete and redundant matter from the system. Its millions of pores, though actively engaged, have ordinarily quite enough to do; but alcohol, by interfering with the regular processes for carrying off waste material, throws a heavier burden upon them. The result is seen in discoloration, blotches, and cutaneous eruptions of various kinds. The "jolly red nose" and bloated cheeks are well-known signs of alcoholic poison which habitual drunkards, by a kind of retributive justice, seem compelled to exhibit. "Does the priest drink?" said one Irishman to another. "No; never a dhrop!" "Then, how comes it that his face is pebble-dashed with strawberries?"

It is needless to go further. Alcohol is not food, but poison. Entering the stomach it impairs digestion; passing into the circulation, it devitalises the blood and wastes the man; ascending to the brain it dethrones reason and destroys control; attacking the heart, it lashes it to undertake more work with less nutrition, unhinges its mechanism, and degrades its structure; pervading the whole body, it leaves no organ or function untouched, and spreads everywhere disorder and disease. Any drink, therefore, of which it forms a considerable percentage is directly baneful in its character.

CHAPTER III.

STIMULANTS.

Supposed need—Effect of habit—Call out reserve—Medical use no argument—Loose prescriptions—Medical condemnation—Oxford Medical Conference—Consensus of opinion—Stimulants not required—Dr. Yeo on Stimulants—Moderation defined—Dr. Parkes on Spirit Ration in Ashantee Campaign—An interesting experiment—Great Western Railway—Anchorsmiths—Arctic experience—Tropical experience—Athletic feats without stimulants—Samson, Angus Cameron, Grace, Weston, Captain Webb, Cavill—Conclusion.

One of the commonest excuses for drinking intoxicating liquors is the supposed need of a stimulant. Many a "moderate drinker" attempts to justify his practice on the ground that his constitution requires it. He declares that he has no appetite for his meals, and requires to have his stomach fortified with a "nobbler" or a glass of wine in order to arouse it to healthy exercise. He insists that even if there is no good in the liquor itself it enables him to relish his food, and so serves a purpose both essential and useful. In this respect he takes somewhat different ground from the labourer, who believes that his beer gives him strength. The latter fallacy has already been exposed by the proof that alcohol is neither good for food nor fuel to the human system, but in dealing with the one error the other will necessarily still further be discussed.

In many cases the craving for stimulants is nothing more than the effect of habit. Human nature rapidly accustoms itself to certain rules. When it has been regularly wound up to concert pitch or a little over at a given time for a few days together, if the stated hour passes by there will be a sense of want, uneasiness, and dissatisfaction. The machine is run down, the man is depressed, he feels an uncomfortable sinking, he "needs a stimulant," and the easiest way is to yield to the craving. As he does so the mechanism starts on again with a temporary renewal of vigour, and as he feels the reviving glow he exclaims that let teetotallers talk as long as they like, his constitution evidently needs a little support. Very possibly he feebly tries, some time or other, to break the chain, but weakly yields without persevering long enough for any firmly-formed habit to be overcome, and thereafter declares he has tried total abstinence and found it did not agree with him. In nine cases out of ten, were the effort honestly and persistently made its result would be manifest improvement in evenness of temper, cheerfulness of spirits, physical health, and mental clearness.

Undeniably there are occasions when a man needs to call out his reserve of strength. Mercantile men have sometimes to draw on the last farthing of their capital and credit, and even hypothecate their future gains to tide them over a season of panic. Military commanders now and then need to bring their last bayonet into action for a final rush. But these are desperate remedies to avert an imminent catastrophe, and he would be no better than a fool who rashly adopted them without sufficient cause. The man who employs stimulants to call up his reserves of force to-day will assuredly be bankrupt when to-morrow's equal demands have to be met. He has not added to his capital, but has laid violent hands on Nature's sacred hoard, and nothing less than impoverishment can be the result.

It involves no weakening of the argument to admit that stimulants have their uses as medicines. When the action of the heart is enfeebled by disease, and the nerve centres need spurring to keep them awake, in the hands of a skilful physician stimulants judiciously administered may prevent collapse and save life. Not that even then they supply strength. The physician's action is analogous to that of an engineer who uses up the last fragments of coal in the bunkers to generate steam and urge the labouring vessel through the stormy sea to a haven where shelter and a fresh supply of fuel may be obtained. Were all that is claimed for alcohol as a medicine fully admitted, it would prove nothing concerning its value as a food. Even allowing that it may be useful in the hands of a skilful medical practitioner, as much may be said for other poisons, such as arsenic and morphia, and its indiscriminate employment cannot be too strongly condemned. Unfortunately, it is generally close at hand. Of all prescriptions it is, to the majority of patients, the most agreeable, and is recommended far more frequently than is either necessary or justifiable.

There seems no room to doubt that medical men, by their loose prescriptions of alcoholic drinks, are responsible to a very considerable extent for the drinking habits of the community. When a patient feels low and out of health he is often simply told to take a stimulant, and he goes on "taking the doctor's advice" to the end of the chapter. With a perseverance worthy of a better cause he continues to use the "medicine" years after the necessity for it has ceased. A generation ago the practice was more general than it is now, and there is ground for suspicion that the hereditary taste too frequently exhibited may be not unfairly attributed to this cause. Dr. F. R. Lees, in his "Doctors, Drugs, and Drink," furnishes terrible testimony to the effects of the careless prescription of alcohol. Among others there is this statement from the Rev. Franklin Spencer, LL.D., Incumbent of St. Matthew's, Marylebone —"It is with much sorrow I observe that medical men are the great promoters of drunkenness in this land; they are always recommending strong ales, porter, and brandy to invalids." He also quotes the Rev. J. H. Irwin, an Independent Minister, who says—

"The number of men, in other respects intelligent, who have been turned out of the good way by the doctors is astounding. I have had to resist, steadfast in the faith that under no conceivable circumstances is alcohol indispensable, or I too should long ago have gone after my brethren in the ministry who were once as enthusiastic teetotallers as myself." These are strong accusations, but it must be remembered that the patient is often as much in fault as the doctor, by demanding the remedies which injure him, persisting in their use when neither prescribed nor needed, and jesuitically interpreting a temporary suggestion to mean a life-long order.

We need not go outside the medical faculty to find strong condemnations of the habit of freely prescribing stimulants, and cautions addressed by eminent men to their brethren in the noble art of healing. Scarcely anything could be stronger than the declaration of Dr. Carpenter—"Nothing in the annals of quackery can be more empirical than the mode in which fermented and distilled liquors are directed or permitted to be taken by a large proportion of medical practitioners.". Dr. Richardson's judicious caution, if acted upon, would materially lessen the evils complained of—"The scientific physician may, I think, use perhaps all the alcohols with advantage in his treatment of disease, but he ought never to attempt their use except as *alcohols*, the precise nature of which he understands. Does he want a quickly-acting stimulant, which takes effect rapidly and eliminates rapidly, taking out little force? he has it in methylic alcohol. Does he want an alcohol that will create a more lasting effect? he has it in ethylic alcohol. Does he want to reduce the body, to prostrate it for many hours? he can do that with amylic alcohol, or butylic, or caproylic. But when he is ordering alcohol by the general loose names of gin, rum, brandy, wine, he has no conception of what he is prescribing, nor of the effect of his prescription." Strong testimony is given as to the possibility of dispensing with alcohol altogether by Mr. L. M. Bennett, M.R.C.S., who says —"During the last twenty-five years, I have not once used alcohol as a medicine, nor recommended it as a beverage; and, although I have had great experience in the treatment of dyspepsia, fever, exhaustion from loss of blood, and profuseness of purulent discharge, I have found all these complaints and conditions much more easily removed without alcohol. . . . . I have, during my practice, attended upwards of 2,000 cases of child-birth, and I have not lost a single case. When a necessity exists for the use of a stimulant in the treatment of disease, a safe, more certain, and effectual substitute can be found." The famous Dr. Mary Walker expresses her grief that medical practitioners prescribe what is of an intoxicating nature, and, with the utmost decision, avers her opinion that under any circumstances such drinks are unnecessary. Dr. Carsen, the President of the Medical Association of Pennsylvania, fully endorsed this opinion when he said—"Neither wine, malt liquors, nor alcohol are necessary for medicinal purposes, and there are more harmless agents in the laboratory which have all the virtue attributed to alcohol." That better agents are available is beyond question. Dr. R. B. Thompson says—"It is universally admitted by scientific men that alcoholic fluids, when employed in medicine, influence the system in those diseases in which they prove efficacious by their stimulating properties, *and here they may be superseded by stimulants possessing equally energetic powers.*" Similar declarations might be multiplied did space permit, but only one more shall be added; it is that of the venerable Dr. Higinbotham, who after the experience of half a century, during the greater portion of which he practised in the centre of a large and populous town, surrounded by more than forty surgeons and physicians, gives the following remarkable deliverance:—"I have amply tried both ways. I gave alcohol in my practice for twenty years, and have now practised without it for thirty years. My experience is, that acute disease is more readily cured without it, and chronic disease much more manageable. I have not found a single person injured by the disuse of alcohol, or a constitution requiring it; indeed, to find either, although I am now in my seventy-seventh year, I would walk fifty miles to see such an unnatural phenomenon. *If I ordered or allowed alcohol in any form, either as food or as medicine, to a patient, I should certainly do it with a felonious intent.*"

One of the most encouraging facts in connection with the temperance reform is that the medical faculty is turning its earnest attention to the giant evil against which we contend. Science is joining hands with ethics, and doctors with clergymen, in the crusade against intemperance. The Medical Conference held in the Sheldonian Theatre, Oxford, on October 30, 1876, showed clearly the direction which men of science are taking. The Conference was held for the purpose of "considering what means can be adopted to check the spread of intemperance," and was largely attended by medical men, clergymen, and laymen of the Church of England, ministers of other denominations, and the general public. As was intended, the medical aspect of the subject chiefly engaged the attention of the meeting. A paper was read by Dr. Richardson, in which he described his researches into the action of alcohol, and summarised his conclusions. An address was also given by Professor Rolleston, and shorter speeches were made by several others. On the question being pressed whether there was a consensus of opinion among the medical men, Dr. Giles is said in the report to have replied—"I think I may answer that question, not only for myself, but also for the major part of my profession—that we can do without alcohol." Another speaker added that for the past twenty-five years he had abstained from alcoholic drinks, and found that he could treat maladies commonly supposed to require such drinks more successfully without than with them. In illustration of the non-necessity of stimulants as commonly prescribed, the Rev. W. Ackworth, Vicar of South Stoke, gave his own experience. He said he had charge of a parish of nearly 30,000 souls, and as an example to them signed the pledge. That very week two hundred did the same, and many of them became sober, serious, and religious men. Shortly afterwards, his health gave way from overwork, and he sought the advice of a well-known physician (Dr. Conquest) of London, who told him his pulse was below par, and he ought to take two or three glasses of port wine a day. He demurred to doing so on account of the bad effect it would have, and the doctor replied, "Oh! if you are inclined to take physic, I can give you physic that will answer the purpose equally well." He thereupon wrote a prescription, which Mr. Ackworth got made up for a shilling, and at the end of a fortnight was pronounced all right. Had he commenced taking port wine, he would probably have continued to that hour.

At the close of the Conference the Chairman (Dr. H. W. Ackland, F.R.S., Regius Professor of Medicine,) carefully and judiciously summed up the results of the discussion. He "heartily congratulated those present on the success of the meeting, and that they should have lived to see such a one in that Theatre. . . . Thirty years ago that was not a subject that would have brought together so large a number of the medical profession to assist in their deliberations. Any person of his age knew that at that time they were taught by experienced teachers that alcohol was thought necessary for not only persons in sickness, but for a large proportion of persons in health. For his own part he never had believed that argument. . . . But Science marched with careful steps. He had come to the conclusion, from such observations as he had been able to make during many years, that a large proporton of healthy persons, except under special circumstances, were not so well if they took any form of alcohol as they were if they took none. . . . One word with regard to the relation of the subject to disease. It was perfectly well known to every ordinarily instructed member of his profession, that the opinion of the profession had undergone a very great change on the subject in two ways within thirty or forty years. Twenty-five years ago people were taught that they could scarcely give enough in many forms of disease. It was equally certain that students of the present day feel that that opinion was exaggerated and mischievous. It had come to be a matter of extreme anxiety to the best instructed members of the profession as to what was the precise dose which ought to be given in many conditions. But as for the old opinion that people in health and living in ordinary conditions could not live or work without wine, it was an opinion no careful or thoughtful physician thought of maintaining, and if he did he should be very happy to battle the subject out with him."

Such being the present general opinion of the faculty, it is peculiarly interesting, as well as instructive, to hear what individual objectors have to say on the other side. There are such objectors, and they take care to keep their views before the public in magazines and reviews. An article entitled "On Stimulants," by J. Burney Yeo, M.D., appeared in the *Fortnightly Review* for April, 1877. The reputation of the writer, with the internal evidence which the article affords of his learning and ability, justify its being regarded as a fair and full presentation of the case. Dr. Yeo sets himself avowedly in antagonism to Dr. Richardson, whom he accuses of having experimented "with that fatal desire to establish a pre-accepted theory which is the bane of experimental science." The answer to this unworthy imputation may be found in the first chapter of this essay, abridged from Dr. Richardson's own statement of the origin of his researches, which has been frequently made, and shows that he had no "pre-accepted theory" at all. It clearly indicates Dr. Yeo's design and theory, viz., to prove Dr. Richardson wrong as far as possible, and that however injurious large doses of alcohol may be, when taken in "moderate quantities" it is harmless if not beneficial. The cursory reader will probably be puzzled to arrive at a definite conclusion, and inclined to think that a case is made out for stimulants, but a little examination will tend to a different result. The paper contains a mass of inconsistencies, illogical reasoning, admissions, and misrepresentations, which, when sifted and weighed, reduce the argument for stimulants to weakness itself, and leave their opponents masters of the field. Dr. Yeo refers to the experiments of Lallemand and Perrin, with the further light thrown upon them by Dr. Anstie, and concludes that Liebig's theory that there is a rapid and complete combustion of alcohol within the system is "very near the truth"—losing sight altogether of the wide difference there is between heat-giving combustion and disease-producing decomposition. He says of Dr. Richardson:—"In all his experiments he appears to have administered alcohol in poisonous or intoxicating doses," whereas in the book to which he directly refers by a footnote, the doctor does not specify the doses he gave, large or small. He argues that stimulants may enable a man to resist cold if taken before or during exposure; says they do so by quickening the circulation, so conveying the warm blood more rapidly through the cutaneous vessels, and also by relaxing the vessels of the skin. The most superficial physiologist can see that this is the very way to lose heat and become chilled during exposure. He then proceeds to support his argument by quoting Dr. Brunton's description of the effects of alcohol *after* exposure to cold, when a man completely chilled through is trying to get warmth by a snug fireside. In the latter case the man is actually being exposed to heat, and relaxation of the cutaneous vessels is desirable because of their constriction during the previous cold. Dr. Yeo is therefore defeated by his own auxiliary. It is curious to observe how by the very stress of his facts he is driven into admissions which neutralise his strongest arguments. Thus he says:—"A moderate dose of alcohol enables a man to put forth a sudden spurt of muscular effort. But it is also clear that if taken by itself it does not long sustain muscular strength. It rather enables a man to draw upon his reserves of strength than to produce new energy." And, again, on its effect on mental work :—"The circulation through the brain is quickened, the nervous tissue receives more nourishment (?), the imagination is stimulated, and ideas flow more rapidly, *but it is doubtful if the power of close reasoning be not always diminished.* It is useful for reviving mental power when, from accidental circumstances, such as want of food, &c., it has been exhausted, *but it should never be relied upon as an aid to continuous effort or close application.*" Whole paragraphs might be cited in which the closing words point in a totally different direction from the opening sentences, the stubborn facts being too strong for Dr. Yeo's preconceived theory, and bending his arguments in an oblique, if not diametrically opposite direction from that which he designed.

The utter inability of any advocate of stimulants on scientific grounds to establish his cause is strikingly exhibited by Dr. Yeo's definition of moderation. He says, and I thank him most heartily for saying it—"In speaking of the use of alcoholic beverages, I have frequently had to employ the word 'moderate,' and the question may well be asked, what does this word mean? It has been calculated that the *daily consumption of an ounce and a half of absolute alcohol is the limit of moderation for a strong, healthy man,* and this will correspond pretty nearly with three ounces of brandy (*i.e.*, rather less than the third of half a pint); rather less than half a pint of the stronger wines, such as port and sherry; rather less than a pint of the weaker wines, such as claret and hock; and *a pint and a half of beer.*"

It is satisfactory to have at last an authoritative definition of the vague term "moderation." For generations it has proverbially meant anything between a glass and a barrel, but henceforth tipplers may take notice that on the authority of one of the very latest scientific advocates of stimulating beverages, anything more than a bottle of ale in the twenty-four hours, or its equivalent in alcoholic strength of more potent liquor, is excess. Such is the ignominious conclusion arrived at by the latest champion of alcohol. It satisfies nobody. Non-abstainers will certainly refuse to be restricted by the limitation, and abstainers will equally decline to accept the dictum.*

However undesignedly, Dr. Yeo has rendered yeoman service to the temperance question. Not only has he mercilessly curtailed the wine-bibbers' allowance, the facts he mentions with approval show clearly that stimulants as a means of enabling men to endure fatigue are a delusion and a snare. They prove incontestably that hard labour can be better performed without than with their employment. He quotes with approbation an extract from the report by Dr. Parkes "On the issue of a spirit-ration during the Ashantee campaign." "When," asks Dr. Parkes, "as so frequently happens in campaigns, soldiers are marching nearly the whole of the day, and can obtain their regular food only late in the evening, what can be given to lessen the sense of great fatigue, and to enable them, not only to continue the march, but to be ready for any emergencies which may arise? The usual resort is to a spirit-ration, and there is no doubt that for a time this exerts a reviving effect. But is it the best thing which can be given, and are its advantages without alloy? The first effect of alcohol, when given in a moderate dose, is reviving; but this effect is transient. The reviving effect goes off after, at the utmost, two and a half miles of additional march, and sometimes much before this. . . . It is clear then that alcohol is not a very trustworthy aid; for supposing a commanding officer having marched twelve or fourteen miles finds his men weary, and not being able to halt and feed them, orders an issue of spirits of an amount sufficient to revive but not to depress; the first effect will be good, but in less than an hour his men will be as weary as before, or probably more so. If he then reissues the spirit within so short a period of time, it is certain that in the case of many men, perhaps the marching power will be lessened."

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* Since writing this paragraph I have observed that Dr. Anstie, in the *Practitioner*, says that as a rule the daily average allowance of absolute alcohol taken by a healthy adult man *should not exceed* from 1 oz. to 1½ oz., in whatever shape it is taken. This still further reduces the allowance. It should be observed also, that this is for a healthy adult man. The amount allowed to the young, the feeble, and to females, must therefore be considerably less.

The use Dr. Yeo makes of this statement is to prove the reviving effect of alcohol. No one denies that it has such an effect, but the temporary excitement is followed by so speedy and serious a depression that it costs far more than it is worth.

In order to ascertain the relative reviving effects of rum, extract of meat, and coffee during marching, Dr. Parkes submitted them to the test of experiment. He selected three intelligent and trustworthy men, who understand the object of the experiments. They were equipped in full marching order, carrying rifle and sword-bayonet, forty rounds of ammunition, kit, haversack, waterbottle, great-coat, &c., the whole making up with the clothes they wore a total weight of 51 lbs. Having breakfasted at six o'clock they started at seven, and marched thirteen and a quarter miles without halt or refreshment. This march took four hours and twenty minutes. After resting for an hour, during which time their pulses and temperatures were taken, they received either rum, extract of meat, or coffee, with in each case ten fluid ounces of water. They then marched four and a quarter miles, and after another halt had a second allowance of the same substance with the same quantity of water. The final march of three miles was then made, making twenty and a half in all. The rate of march was 3·2 miles per hour; the time taken being eight hours and a half, including halts. At the end of the last march the men had their dinner. The rations were the usual rations, and the same amount of food was taken daily. The marches were continued for six days, so that each man received rum on two (but not successive) days, meat-extract on two days, and coffee on two days.

At the close they were asked to state their candid opinion of the relative value of the three substances, and they did so in a decided manner, and with the most perfect unanimity.

Private W. Hutchins said:—"I prefer the meat extract. It certainly gave me more strength for marching. It does not put a spurt into you for a few miles only, but has a lasting effect. If I were ordered for continuous marching and had my choice, I would certainly take the meat extract. I prefer the coffee to the rum. It quenched thirst; the rum at the end of a couple of miles left you as bad as before, or even worse, while the coffee had no effect of this kind."

Private P. Holz said:—"I prefer the meat extract for getting along in marching. As regards the coffee, I would put it before the rum, as the effect of the rum went off in two miles, and I felt better after the coffee than after the rum."

Serjeant-Major Don said:—"The meat extract is the best to march on. More strength is given by it. About this I have not the slightest doubt. After the extract I prefer the coffee, and I put the rum last for marching."

In connection with the same interesting question, Dr. Parkes refers to the experience of a large body of men engaged in severe toil and working long hours during a protracted period, when the change was made from the broad to the narrow gauge on the Great Western Railway. It is said to have been the greatest work of the kind ever done in England. From an account given by J. Ward Armstrong, Esq., Divisional Engineer, who made the arrangements and conducted the operation, it appears that the number of men employed was about 1,500, and the time occupied nearly two weeks. As it was necessary to take up and relay the rails in the shortest time possible, the summer days were chosen, and the men worked nearly day and night. The work done was enormous, for the rails on that line were held down by bolts screwed into nuts, all of which had to be unscrewed and replaced after moving the rails two feet. As the period of completion was governed by the number of large stations and sidings to be dealt with, the open main line was manned so as to just keep abreast of their progress, and thus the utmost amount of exertion was maintained at every point. Working thus sometimes for eighteen hours a day, and only stopping during the whole time for meals and a little sleep, *the only drink supplied to the men was oatmeal and water*. Each man had an allowance of one pound of oatmeal and half a pound of sugar, and so important was this deemed that a man was told off to every twenty men whose sole employment was to boil this oatmeal drink and supply it as required. The liquid was drunk in large quantities, and its supporting power spoken of by many of the men with great approbation. During the whole work there was not a single case of drunkenness or illness.

The practical value of this incident as a testimony to the uselessness of stimulants when hard work has to be done is increased by the large scale on which the experiment was conducted. In various ways the question has been tested, and invariably with the same result. A recent publication entitled "The Worship of Bacchus a Great Delusion," gives as an illustration an experiment tried by Dr. Beddoes. He ascertained that the hardest-working men were those employed in forging ship anchors. Not only was their work extremely severe, it also exposed them to great alternations of temperature, and kept them in a constant excitement and perspiration. Their employers allowed them an unlimited supply of strong beer, and Dr. Beddoes proposed that six of them should drink only water for one week, while six others continued their usual allowance of beer. The men were amazed at the proposition, and asked the doctor if he wanted to kill them? did he suppose it possible they could endure such fatigue under such circumstances? The doctor assured them he did not intend them any harm; he would watch their progress, and take care they did not sustain any injury. He offered to put down £50, and said, "Try water for one week; if you succeed the £50 is yours; if not, I shall put it back in my pocket." The two sets of men were pretty much alike on the first day of trial; on the second the water-drinkers complained less of fatigue than their comrades; the difference was still more apparent in favour of water on the third day; it increased on the fourth and fifth; and on Saturday night the water-drinkers declared that they never felt so fresh in all their lives as they had felt through that particular week.

It is all the same whether the experiment be trted in Arctic cold or tropic heat. Sir John Ross when in the Arctic regions first tried the experiment of abstinence upon himself, and then persuaded his men to adopt it. He says:—"As I was the only person who drank no spirits, and the only one who did not suffer from inflamed eyes, I represented that the use of grog might be the cause, showing that although I was very much the oldest of the party, I bore fatigue better than any of them." The men acquiesced in his suggestion without hesitation, and in commenting on the effects of spirits, Sir John says:—"The immediate stimulus gives a temporary courage, and its effect is mistaken for an infusion of new strength; but the slightest attention will show how exactly the reverse is the result. It is sufficient to give men under hard and steady labour a draught of the usual grog to perceive that often in a few minutes they become languid or, as they generally term it, faint, losing their strength in reality, which they attribute to the continuance of the fatiguing exertions. He who will make the corresponding experiments on two equal boats' crews rowing in a heavy sea will soon be convinced that the water-drinkers will far outdo the others." This is fully corroborated by the experience of the last Arctic Expedition, when the Good Templars of both the Alert and the Discovery were kept free from scurvy, *except one who broke his pledge.*

Turning to the other extreme we find similar and equally unimpeachable testimony. Dr. Mosely, in his work on "Tropical Diseases," avers from his own personal knowledge as well as the observations of many other people, "that those who drink nothing but water, or make it their principal drink, are but little affected by the climate, and can undergo the greatest fatigue without inconvenience, and are not subject to troublesome or dangerous diseases." This deliverance on the superiority of water to any other beverage is one side of the argument, which is clinched by the emphatic remarks of Dr. Bell:—"Rum, whether used habitually, moderately, or in excessive quantities, in the West Indies, always diminishes the strength of the body, and renders men more susceptible of disease, and unfit for any service in which vigour or activity is required."

Evidence of a similar kind crowds upon the enquirer after facts, for the action of stimulants has been tested again and again, and always with the same adverse result. They have been weighed in the balances, and found wanting. The sentence pronounced against them by science has been confirmed by practical experience, and is absolutely irreversible. Their physiological action, by diminishing nervous control, renders them palpably injurious to those who undertake mental exertion. Their effect on the imagination is something like that of removing the bridle from a horse, and at the same time spurring him to a headlong gallop, the result of which is seen in such extravaganzas as those of Edgar Allen Poe. Individual facts of physical strength and endurance at which the world has wondered, as well as those performed by bodies of men, have been wrought without alcoholic stimulus. Samson was a water drinker, and yet he carried off the gates of Gaza! Angus Cameron, whose steadiness of nerve has twice enabled him to win the Queen's Prize at Wimbledon, is a teetotaller. So is Grace, the famous cricketer, who makes perhaps more runs in a season than any man in England. Weston, the famous pedestrian, who walked 500 miles in six days, drank nothing stronger than tea, coffee, and essence of beef. Captain Webb astonished the world by swimming across the Channel. He accomplished the feat without aid from intoxicants; while Cavill, though considered an equally expert swimmer, through his reliance upon them not only failed, but had to be helped out of the water in a half-drowning condition. Commenting on his failure, both he and the attendant surgeon attributed it to the stimulants he was plied with, and Cavill remarks—"On my next attempt I do not intend having any stimulant whatever in the boat." Instructed by experience, he has since made another attempt without stimulants, and sustained chiefly by cocoa-leaf swam across in even less time than was taken by Captain Webb.

All these instances go to prove that the supposed need of stimulants is only imaginary. They are not required by healthy people, and artificial stimulation is positively injurious. Intoxicating liquors are rarely if ever required in the treatment of disease, and their free employment even then without distinct medical authority is a dangerous tampering with the constitution.

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CHAPTER IV.

WINES IN GENERAL.

Their fascination—Unnatural appetite—Occasions adulteration—Ingredients used—Adulteration of Gin—Port—Mr. Forrester's exposure—Its corroboration—Further falsification—Dr. Thudichum on "Burgundy"—Mr. Redding on Champagne—Applied chemistry in wine making unlimited—Hambro' wines—Grapes unnecessary—Rivalry between merchants—An awkward dilemma—M. Petiol's process—Does anybody drink wine?—The Victorian Royal Commission—"Anything to give drunk"—Craving for stimulation—A vicious circle.

Attention has been chiefly directed in the preceding sections to the character and effect of alcohol. The examination has proved that it is *not* food, that it is poison, and that its stimulating properties are no real advantage. As wine, it still urges its claim to popular approval on the ground of its palatable and agreeable nature. This last argument has now to be considered. The fact that wine possesses a wonderful power of fascination may be at once admitted, but whether that fascination is an element in its favor is a totally different question. Were so heavy an indictment brought against any other article of ordinary consumption as is lodged against this, we may feel certain that strong suspicion would be aroused; and were the charge so clearly proved as it is in this instance, it is hardly likely that the offender would be further tolerated in good society. Wine, however, has entrenched itself so strongly in the appetites and inclinations of its votaries that to dislodge it from its position is a task of no common difficulty. Physiology, chemistry, sanitary reform, political economy, morality, and religion, are all against it, and yet it holds its own. Wine-drinkers admit the justice of the charges made, and yet say that whatever may be its faults, they are accustomed to its use, and cannot do without it. A certain minister on being remonstrated with for his choice of a wife is said to have replied—"Well, brethren, I don't pretend she is a saint, but she is a very pretty little sinner, and I love her." The answer was held to be conclusive. Similarly, even a toper will sometimes confess his weakness. He admits that there is no genuine good in the thing he adores; it is stained with a thousand crimes; but in spite of everything it has charmed and enslaved him; he loves the fascinating sinner, and will not cast it aside.

Advocates of temperance do not stand alone in their crusade against the popular fancy. Wine merchants and vignerons loudly declaim against the vitiated taste which runs after chemical preparations, fiery stimulants, and sweetened decoctions of who knows what. There is ample evidence to be obtained, not from total abstainers only, but from those who are actively engaged in the wine trade, that an unnatural taste exists, establishing a demand for which there is a supply, as abominable as it is abundant. How to correct the depraved taste of the people is a problem yet unsolved. Teetotallers advise the diffusion of information, and spread of total abstinence principles. Wine-growers recommend the free use of their own production. Mr. Gladstone opened the English market to light French wines, which was expected to work a perfect cure. This measure did not prove so great a success as was anticipated. Messrs. Haig and Co., in one of their circulars, say—"There is, indeed, very little doubt that Mr. Gladstone's measure has utterly failed to produce the effect he anticipated. His flowing rhetoric may take captive the minds of his countrymen, and his specious logic may mystify their understandings, but his thin wines fail to satisfy their English stomachs." Deep and loud are the lamentations over the national folly which still requires brandied sherry and doctored port. Mr. Ford, in his "Gatherings from Spain," says—"The ruin of sherry has commenced from the number of second-rate houses which have sprung up, which look for quantity not for quality. Many thousand butts of bad Nubla wines are thus palmed off on the enlightened British public, after being well brandied and doctored. Thus a conventional notion of sherry is formed, to the ruin of the real thing; for even respectable houses are *forced to fabricate their wines so as to suit the depraved taste of their customers.*"

The artificial appetite which is thus complained of is deep-rooted and wide-spread. Its formation does not depend on the whim or fancy of an individual, far less is it formed by the exercise of his judgment. It is to a large extent national. Some national likings and dislikings have their basis in constitutional temperament, and are fostered by climate, habits of life, and local circumstances. This appears to be one of them. The cold, damp, English climate renders the sub-acid wines of France unsuitable, and therefore the acidity is disguised while a larger amount of spirit is added to give the desired stimulus. Such tastes, moreover, are largely hereditary. The love of stimulants is peculiarly transmissible from father to child, and it must be the work of generations to effect any marked alteration, even if it is ultimately eradicated.

However the fact may be accounted for, there is no denying that it exists—a vitiated taste, creating a demand for liquors in which whatever excellence the juice of the grape originally possessed, is utterly destroyed by the mode of manufacture, and deleterious adulterations. Thanks to the rivalry between wine countries, and the war among wine sellers, the truth as to fraudulent practices can be ascertained on unimpeachable authority. Adulterations of wine appear to be as old as wine itself. It has been gravely suggested that Ham drugged his father's liquor; that the disgraceful exposure of Noah was the result rather of stupefaction than intoxication; and that the curse pronounced upon Canaan was the just punishment of his mal-practices. If this is so, it is to be regretted that the tremendous penalty has not had a more deterrent effect. Prior to the invention of distillation, other means were employed to strengthen the juice of the grape, evidence of which we have in the mixed wines of the Bible and classical authors. When we read of wine mixed with sea-water, and know that the ancients infused assafœtida, tar, bitumen, pitch, myrrh, aloes, gum, pepper, spikenard, poppies, wormwood, cassia, milk, chalk, bitter almonds, cypress, and other things, we can only wonder at the ingenuity which combined, and the taste which approved such compounds.

Many of the substances formerly used in adulteration appear to modern taste utterly nauseous, but were a list compiled of the appliances by which the requirements of customers are now met, it would be found to contain ingredients at least equally objectionable. In the manufacture and treatment of malt liquors, the following ingredients are employed for various purposes:—Malt, hops, sugar, honey, molasses, stick liquorice, Spanish ditto, colouring, cocculus indicus, calamus aromaticus, quassia, gentian, coriander, capsicum, carraway-seeds, grains of paradise, ginger, salt, salt of tartar, beans (malted), oyster-shells, isinglass, alum, &c. Spirits, in addition to the more pernicious form of alcohol—fusel oil—are rendered still further injurious by many other powerful agents of evil. Among these are oil of juniper, oil of bitter almonds, potassia, alum, nitric acid, oil of vitriol or sulphuric acid, and butyric acid. All these exert a more or less baneful influence on the body into which they are introduced. If taken for any long-continued period, even small quantities will produce injurious effects. Oil of juniper is an active diuretic, and injures the excreting power of one of the most important of the vital organs. Oil of bitter almonds contains, unless it be specially purified, prussic acid, and exerts a prejudical influence on the nervous functions.

Potassia is used for the purpose of "biting the palate," that is to say, to exert a dry and caustic action on the mucus membrane of the mouth, throat, and stomach. The acids named above are all astringents, and alum is also an astringent, producing constipation, and sustaining a permanent dyspepsia so long as it is being swallowed.

According to Dr. Richardson, the spirit in common use that is most subject to these chemicals is gin. "Gin has to be made cordial, to be sweetened, to be rendered creamy and smooth, to be flavoured, to be made biting to the palate, to be beaded, and what not else. To be made 'cordial' it must be charged with oil of juniper, with essence of angelica, with oil of bitter almonds, with oil of coriander, and with oil of carraway. To sweeten it, it must be treated with oil of vitriol, oil of almonds, oil of juniper, spirits of wine, and loaf sugar; to 'force down' it must be further treated with a solution of alum and carbonate of potassia. To be rendered creamy and smooth, it must be sweetened with sugar, and lightly charged with a small quantity of garlic, Canadian balsam, or Strasburg turpentine. To give it piquancy, it must have had digested in it shreds of horse-radish. To be made biting to the palate, it must receive that touch of caustic potash of which I have spoken." The "pearly" or "beaded" appearance which proves to the gin-drinker that his wicked liquor is the *creme de la creme*, has been produced in the following manner:—An ounce of oil of sweet almonds has been added to an ounce of oil of vitriol. These have been rubbed together in a mortar with two ounces of loaf sugar, until a paste has been formed. The paste has next been dissolved in spirit of wine until a thin liquid has been produced, and this added to one hundred gallons of gin, has given the fine pearly bead that is so much admired.

Returning to our own proper subject, there is proof *ad libitum* of the manner in which wine is falsified. It has been remarked that in books about wine the liveliest and most entertaining reading is that which describes these frauds and sophistications, and any one who examines the subject will probably admit the justice of the observation. The exposure which has been going on for years forms a most instructive study. In the year 1844, Mr. J. J. Forrester (Baron de Forrester in Portugal), published the following statement of how port wine is made:—"To obtain black, strong, and sweet wine, the following are the expedients resorted to:—The grapes being flung into the open vat indiscriminately, with the stalks sound and unsound, are trodden by men till they are completely smashed, and then left to ferment. When the wine is about half fermented, it is transferred from the vat to tonels, and brandy (several degrees above proof) is thrown in, in the proportion of twelve to twenty-five gallons to the pipe of must, by which the fermentation is generally checked. About two months afterwards this mixture is coloured thus:—A quantity of dried elderberries is put into coarse bags;

these are placed in vats, and a part of the wine to be coloured being thrown over them, they are trodden by men till the whole of the colouring matter is expressed, when the husks are thrown away. The dye thus formed is applied according to the fancy of the owner, from twenty-eight to fifty-six pounds of the dried elder-berries being used to the pipe of wine! Another addition of brandy, of from four to six gallons per pipe, is now made to the mixture, which is then allowed to rest for about two months. At the end of the time, it is, if sold (which it is tolerably sure to be after such judicious treatment), transferred to Oporto, when it is racked two or three times, and receives, probably, two gallons more of brandy per pipe; and it is then considered fit to be shipped to England, it being about nine months old. At the time of shipment, one gallon more of brandy is usually added to each pipe. The wine thus having received at least twenty gallons of brandy per pipe, is considered by the merchant sufficiently strong, an opinion which the writer, at least, is not prepared to dispute."

Of course, Mr. Forrester's statement became the subject of a fierce controversy. He was assailed with the bitterest invectives. Meetings were held in Oporto, and he was denounced as a charlatan, and his assertions as vague, unfounded, inexact, and above all schismatic. Fortunately, he possessed one of those vigorous natures which are not easily cowed by mere numbers; indeed he seems rather to have enjoyed the strife. He obtained documents from the municipal chambers of towns situated in the principal districts of the Alto Douro, which fully corroborated his statements, and lamented in equally strong language the practices referred to. In his own words, "The charge of falsehood against the author was made to recoil on the utterers of that charge, and the enemies of truth were plainly told that however great their number, they had much to learn, rationally and morally, before they could rightly estimate, and much less stay, the proceedings of an honest man, actuated by right feeling, and governed by common sense."

Many years afterwards the substantial accuracy of these statements was confirmed by Her Majesty's Secretary of Legation at Lisbon—Mr. Lytton, now the Viceroy of India—who, writing in 1867, says, respecting this same elderberry adulteration:—"All port wine hitherto exported for the English market is largely mixed with brandy, and is composed almost as much of elderberries as of grape. . . . This is the composition of all the port wine hitherto drunk in England. No pure wine—no wine not thus specially adulterated for the English taste—was allowed by the Government Committee of Tasters to pass the bar of the Douro for export to England before the year 1865."

But the fabrication does not end here. The wine thus exported is the raw material to be operated on. It seems that the casks of wine on their arrival in the London Docks are again emptied into large vats, when the whole quantity is again treated with brandy, burnt sugar, and other ingredients according to the prevailing taste, and after laying down in the vaults for a more or less protracted period, is ready for consumption as Pure London Dock Port! Now, as no one thinks of prizing wine which has not been laid down for ten or a dozen years at least, and as it would be heresy to doubt that wine improves with age, this statement ought to make lovers of "fine old crusted port" somewhat suspicious, and compels us to believe that the precious cobweb-covered magnum is something like the butler who decants it so carefully—trustworthy only so long as no enquiry is made into its character.

It is scarcely necessary to say that port is not the only compound which obtains credit on false pretences. Sherry has already been referred to. Among connoisseurs burgundy takes a position which it would speedily lose if its admirers were to act on the following bit of advice from Dr. Thudichum, who is an unquestionable authority:—"Go and see vinification in Burgundy. Feet in and out of boots, in and out of vats, alternating from boots to vats and vats to boots; naked men up to their necks in vats of what might have become delicate wine, doing the 'foulage' and almost dying over it, rotten 'chapeaus' not removed, yielding the rotten egg flavour, which some profess to believe to be the sign of genuinenes of Burgundy wine." Champagne is sometimes styled the royal wine, and at banquets takes a proud pre-eminence. Do you want to render the guest of the evening the highest possible honour? drink his health in bumpers of champagne! The characteristic popping of corks, the sparkling amber of the fluid as it "giveth its colour aright" in the delicately-cut glass fashioned especially for its reception, are associated with scenes of gayest festivity. It seems little less than sacrilege to tamper with it, and yet Mr. Cyrus Redding deliberately says "it is adultered in England with more boldness than any other. There is a very weak champagne made in the country which was until very lately consumed wholly on the spot, incapable of resisting decomposition more than a year. This certain shrewd wine-makers from England have discovered, and imported as the best champagne. It is without the flavour or bouquet of the genuine wine; it froths or effervesces freely, but the colour is paler than that of the better quality. *This wine is not worth more than a few sous the bottle* in the country. In England it is purchased and drunk for the genuine article by those who are only now and then introduced to wine of that name." He also says—"In England champagne has been made from white and raw sugar, crystallised lemon or tartaric acid, water, home-made grape-wine, or perry and French brandy. Cochineal or strawberries have been added to imitate the pink. Such a mixture at country balls or dinners passes off very well." This was written many years ago, and since that time things appear to have gone from bad to worse, for the *Lancet* of May 29, 1869, contains the following:—"From a statement recently put forth, the manufacture of imitation champagne and other sparkling wines appears to be greatly on the increase, and likely to assume gigantic proportions. It is declared that some German chemists have patented a machine for facilitating the manufacture of such imitation wines, which, it is reckoned, *may be produced at ten shillings per dozen*, and yet yield a net profit of £30 upon a thousand bottles. A list is given of nearly one hundred houses which have acquired the right to use this patent; and, as two other lists have been made public, the concession must have been granted to a large number of persons in Germany. But it is probable that it will not be long before these 'sparkling hocks' and 'sparkling moselles' make their way into France and other countries, including England." It would almost appear that the more choice and *recherche* the wine the less likelihood is there of its being genuine.

There seems indeed to be no limit to the art of "applied chemistry" in wine-making. Angus Reach, in his "Claret and Olives," supplies a suggestive sketch of the trade done in the Mediterranean port of Cette, whence issue a large portion of the after-dinner drinks of both America and the nations of Northern Europe. He says a Cette industrial will write "with the greatest coolness over his Porte Cochere, '*Ici on fabrique des vins*.' All the wines in the world indeed are made in Cette. You have only to give an order for Johanisberg or Tokay—nay, for all I know, for the Falernian of the Romans, or the nectar of the gods—and the Cette manufacturers will promptly supply you. They are great chemists, these gentlemen, and have brought the noble art of adulteration to a perfection which would make our own mere logwood and sloe-juice manufacturers pale and wan with envy. But the great trade of the place is not so much adulterating as concocting wine. Cette is well situated for their notable manufacture. The wines of Southern Spain are brought by coasters from Barcelona and Valencia; the inferior Bordeaux growths come pouring from the Garonne by the Canal du Midi; the hot and fiery Rhone wines are floated along the chain of étangs and canals from Beaucaire. With all these raw materials, and, of course, a chemical laboratory to boot, it would be hard if the clever folks of Cette could not turn out a very good imitation of any wine in demand. They will doctor you up bad Bordeaux with violet powder and rough cider, colour it with cochineal and turnsole, and outswear creation that it is precious Chateau Margeaux vintage of '25. Champagne, of course, they make by hogsheads. Do you wish sweet wines from Italy and the Levant? The Cette people will mingle old Rhine wines with sweet wines from the neighbourhood of Lunel, and charge you any price per bottle. Do you wish to make new claret old? A Cette manufacturer will place it in his oven, and after twenty-four hours regulated application of heat, return it to you nine years in bottle. Port, sherry, and madeira, of course, are fabricated in abundance with any sort of cheap wine and brandy for a stock, and with half the decoctions in a druggist's shop for seasoning."

The manufacturing skill displayed in this instance is rivalled if not outdone elsewhere. A famous advertisement which appeared in *The Times* has often been quoted :—

"PARTNER WANTED.—A practical distiller, having been experimenting for the last seventeen years, can now produce a fair port and sherry, by fermentation, without a drop of the grape juice, and wishes a party with from £2,000 to £3,000, to establish a house in Hamburg for the manufacture of wines. Has already a good connection in business. Apply to ——."

Notwithstanding the audacious publicity thus given to the imposture, Hambro' sherries are still in the market. To those who understand the geographical limits of vine-culture, genuine Hambro' wine will appear about as likely as Iceland cocoanuts ; but unfortunately the knowledge is not generally applied. Messrs. Haig & Co., in one of their circulars issued some years ago, speaking of this Hambro' sherry, say :—"We ourselves have been informed by a gentleman whose brother is a merchant in Hambro', and had, or has, an establishment there for its manufacture, that large quantities of the worst German wines, which are too sour to drink, but not good enough for vinegar, are brought into Hambro' and there emptied into great vats with a quantity of chalk or lime to correct the acid, the chalk being added until all effervescence ceases." A neutral mass, as it is called, having been thus obtained, a little sour wine is added to "give it life ;" then potato spirit to make it stimulating is added, and a trifle of "sherry flavouring," or extract of sherry made in Berlin, completes the delectable compound. The extract of sherry, it should be mentioned, is a manufactured ether, the product of decomposing matter. The potato spirit can be obtained at a shilling a gallon, and its potency being largely modified with Elbe water accounts for the cheapness of the liquor. The free employment of lime reminds one of Falstaff's tirade against the landlord of the Boar's Head :—"You rogue, here's lime in this sack ; there is nothing but roguery to be found in villainous man ; yet a coward is worse than a cup of sack with lime in it ; a villainous coward."

The strife between different countries has sometimes waxed fierce and bitter, the result to an impartial enquirer being something like that which happens to an honest man when rogues quarrel. When the article entitled "Wine, and the Wine Trade" (from which some of the above quotations have been taken) appeared in the *Edinburgh Review*, a Spanish dealer wrote to the *Morning Star* complaining of it. One of his rivals immediately replied, pointing out that the question was not whether Spain produces good wine, but whether that which England gets from Spain is pure ; and adding that after laborious endeavours he had never succeeded either in obtaining pure sherry, or finding any one who dealt in it. The writer, a Mr. Denman, was a dealer in Greek wines as well as those of other countries, and stood up for his own merchandise, offering consolation in the pure wines of Greece to those who rejected the wines of Spain and Portugal for their impurities. The Spaniard retorted with a whole platoon of statistics designed to show that in one district of Spain more natural wine was produced than in the whole of Greece. He admits the addition of spirit, but says as long as people prefer their wines sweet and strong, he does not see why they may not indulge their preference; further mentioning that brandy is only essence of wine after all. It is somewhat strange that this new name for brandy has not been adopted by distillers; but it availed M. Piodela nothing in the controversy. Returning to the charge, Mr. Denman sneered at him for not stating where good Spanish wine was to be obtained, and then rather impolitely questioned his veracity. He says:—"I doubt his modesty less than I do his assertion about those butts; so let his modesty cover, as a Spanish cloak, the tattered reputation of sherry—I am content." Not quite content, however; he reiterates his assertion that no pure wine is to be obtained, and offers to recant if it can be produced. This appears to have infuriated the Spaniard as a red rag is supposed to exasperate a bull. It made him utterly lose his politeness and almost dance with frenzy. He charged his opponent with uttering untruths, and says that if Englishmen prefer pure natural wine, and yet say that of the large quantity they import annually there is none answering the description, they write themselves down asses. For all that he fails to disprove the accusation.

The fact seems to be that chemistry is sufficiently powerful to leave consumers at the mercy of the manufacturers. Given a particular variety of wine, the ingredients and their relative proportions are easily ascertainable, and can be supplied or imitated to order. Mr. Redding tells a tale which shows that this has long been the case. In the days when George the Fourth indulged his early dissipation, he possessed a small quantity of remarkably choice and scarce wine. The gentlemen of the suite believing it to have been forgotten, and having a taste scarcely inferior to their master, had disposed of it almost to the last bottle when, to their consternation, a demand was made that it should be forthcoming at an entertainment on the following day. In their dilemma one of them went off in haste to consult a noted brewer who, finding that there was sufficient left to serve as a sample, undertook to supply the deficiency, which was done so cleverly that the deception was never discovered!

Reference has already been made to what Dr. Thudichum says about Burgundy. A process carried on by M. Petiot, a wine-grower in that region, is thus described in the *Edinburgh Review*:—"The grapes passed between wooden rollers (we are glad to escape the foot-treading process), and freed from their stalks, are pressed into an upright vat, which has a false bottom. The must is now allowed to flow out while very little pressure is made upon the mass. The must so collected is treated in the manner described above. To the grapes left in the vat a quantity of cold water is added equal to the volume of the must previously drawn away. The grapes are covered and allowed to soak in the water for two days, being frequently stirred. The water dissolves various soluble materials in the mark or grape skins, including the substance which gives to their wines their special taste and odour, and which, it appears, adhere strongly to the grape mark. At the end of two days the liquor is withdrawn and tested for sugar and acid. It usually contains but 2 or 3 per cent. of sugar, and must have 17 or 18 per cent. added. Usually, also, it is deficient in acid, and must have as much tartaric acid dissolved in it as testing shows to be needful. It is then set to ferment." The writer observes that even a third wine is made in like manner from the grape skins, the only difference being that more sugar and acid has to be added. "Like the Irishman's knife that had a new handle and a new blade, so little of the original grape juice can have been left, that we do not see why the process should not be carried on indefinitely, the tannin of the grape being chemically added, and the bouquet, which the addition of water does not enfeeble, given by means we have before alluded to."

In facts like these we find good ground for the enquiry, whether anybody drinks wine who trusts to the imported article? The *New York Tribune* says that so far as America is concerned, there is good reason for suspecting that pure wine is the one thing that never comes into the market, or is never tasted if it does. On reviewing the various sources of supply it finds fraud and adulteration everywhere. In that country, as elsewhere, there is the same story of a vitiated taste, approving, not of the genuine product of the vine, but of certain qualities introduced by the manufacturer, and which are more or less deleterious. The public has no right to quarrel with the maker. He only supplies what it demands. The fault lies with itself. But whoever is to be blamed for it does not alter the fact of the worse than equivocal character of the drink.

What is true in America is generally to a large extent applicable, in these colonies. Colonial wine-makers inveigh loudly against spurious and adulterated liquors. We are much obliged to them. We owe much to the outcry they have made, for it has let in a flood of light on the subject. However we may dissent from their motives, we have reason to be grateful for their labour, and may profit by its results. The report of the Royal Commission which was appointed in 1866 to enquire into the operation of the wine and spirit sale statute in Victoria is a perfect arsenal for teetotallers. One witness examined by it was Mr. Eric Magnus Meyer, a practical distiller and chemist, who, in the samples submitted to him found sugar of lead in sherry, blue vitriol in brandy; port wine which was not port wine at all, but "a most injurious article"; and from all obtained spirit which he described as having an awfully nasty smell, and so bad that it was "enough to poison a horse." Besides this, in the beer, he found "an enormous quantity of salt," the object of which is evident, and "a trace of strychinine." Mr. William Johnson, the government analytical chemist, said he had detected fusel oil in all the seven samples of beer submitted to him, one of the brandies was "a compound of rum and potato spirit," and another "entirely fictitious," containing only a small quantity of brandy just to flavour it. Mr. John Drummond Kirkland, lecturer on medical and practical chemistry in the Melbourne University, had tested upwards of 180 samples of ale, principally colonial, and concurred in what Mr. Johnson had said as to the presence of fusel oil. With regard to this ingredient it may be desirable to mention that it is not understood to be added to the beer, but produced in its manufacture. Mr. Kirkland's evidence on imported wines was as follows:—

"2,065. Have you examined any samples of imported wines? Yes, upwards of fifty samples, obtained principally from public houses.

"2,066. Did you find them to be adulterated? Yes; I examined some wine which was stated to be similiar to the so-called 'Hamburg wine,' and I found it was a made-up wine, containing ordinary spirit, water, and a little flavouring and colouring matter The wine was supposed to be sherry.

"2,067. Was it bought in Melbourne? No; it was sent to me from the Custom House. Since then I have examined wines bought in Melbourne, and found them to agree with that analysis."

These statements do not require any comment. Several witnesses concurred in stating that the supply of such atrocious compounds was due to the public ignorance and general demand. A low-priced article was most in favour, and better liquors had no chance in the competition. One witness—a magistrate—declared the liquor generally sold to be unfit for human consumption, and said the public taste was so depraved that they did not know a good thing when they met with it. What obtains in one colony is probably true with slight modifications of the entire group, and the moral to be applied is this:—The blame of fabricating, mixing, and adulterating drink is as much the fault of the buyer as of the seller.

Those producers who try to be honest find it does not answer their purpose, and if they wish to do a trade they must comply with conventional ideas. These ideas are not very far removed from the catholic taste of the Polynesian chief who dined with Captain Cook, and when asked what liquor he preferred, replied, "Anything that make wet, and give drunk."

It is undeniable that the desire for stimulants grows with what it feeds upon. The stomach, seared by strong spirits, cares nothing for drink of a lighter and less sensational character. Speaking of ancient methods of strengthening wine with aromatics, spices, &c., Redding employs language which is equally applicable to modern customs:—"The very use of these adulterations shows that the stomachs which relished them had either first been debauched and debilitated by excess, or that health and social cheerfulness were not objects in the vinous draught, but that a stimulant, operating rapidly and producing ebriety with speed, was the real thing sought after. In the West Indies formerly, when a stomach was well nigh worn out, the acceptable stimulant, taken as a cordial, was a glass of brandy with cayenne pepper in it, usually termed "a flash of lightning."

The application of these facts in relation to wine is obvious. Praises of the generous flood, the bounties of nature, and so on, are utterly misplaced. Sensation is not to be trusted. Popular applause is given, not to a natural beverage, but to a product of chemical skill. The subject arranges itself in a truly vicious circle. The public taste being depraved, clamours for and obtains an article which confirms it in its depravity. It is so thoroughly vitiated that it rejects what is worthy of approval, and approves what it ought to reject. Its verdict as to the agreeableness of certain liquors proves nothing as to their real excellence. On the other hand it demands an artificial production, encourages the arts of the maker, tolerates deleterious compounds, thus fostering and establishing the very desire which these concoctions are designed to gratify.

CHAPTER V.

"Good" Colonial Wine.

The vigneron's plea, "wholesome and innocuous"—Condemnatory admissions—Our stand-point different—Saul among the Prophets—Not the pure juice of the grape—Alcoholic fermentation—Mr. G. Francis—M. Bourbaud—Radical changes—Difference between grape-juice and wine—Professor Mulder—Agreement of authorities—Combined effect of their statements—A tabular view—Alcoholic wine not "the fruit of the vine"—Royal Commission of 1874 on "Alcoholic Strength," &c.—"Naturally excel"—An innocent specimen!—Added spirit—No sale for "pure" wine—Must resemble imported liquor—An amusing illustration—Public not connoisseurs.

It is claimed for South Australian wines by those who are interested in their production that they are far superior to imported wine. A pamphlet issued about eight years ago by some of the principal vignerons of this colony contains an exposure of the wine-trade in Europe, extracted from the *Edinburgh Review*. It is entitled "Gossip about Wines," and appears to have been reprinted from the *South Australian Register* of December 4th, 1869. The following is the introductory sentence:—"Wine buyers, wine sellers, wine drinkers, and all who are interested in promoting temperance by securing the general consumption of a wholesome, innocuous, and unadulterated beverage, are invited to a careful consideration of the facts and suggestions contained in the following interesting and amusing sketch, for the accuracy of which the high character of the *Edinburgh Review* will no doubt be accepted as conclusive evidence." Several quotations have already been made from this evidence, which there need be no hesitation in accepting as trustworthy, but until two blacks by some recondite process of physics make one white, its testimony in favour of colonial wine is absolutely nil. How any liquor which contains twenty-five to thirty per cent. of proof spirit can be styled "wholesome and innocuous" is difficult to understand. In what way temperance is likely to be promoted by the "general consumption" of such beverages is not explained, nor would their advocates find such an explanation an easy matter. The meaning attached to the word unadulterated must be very elastic, for towards the close of the pamphlet the following remarks occur:—"It is well-known that spirit for fortifying is very freely used in this country, but when added in larger quantities than from two to three per cent. it ceases to be an improvement to the wine as wine, and tends to produce discomfort to the drinker that would never arise from pure wine. When spirit is used great care should be taken not only that it should be flavourless, but also that it should be a *wine* spirit, and that it should be free from the essential oils which pass over in careless distillation, and which are rank poisons, though sometimes slow in their action."

The condemnatory admissions in this quotation go far to neutralise all that the warmest friends of colonial wine can say in its favour. The most inveterate opponent would hardly care to say more than that it is nearly all fortified with added spirit, that the spirit is often carelessly distilled, and that there is not only the evil of excessive alcohol, but of the essential oil (better known as fusel oil), which is justly described as rank poison. He would probably add one more count to the indictment which could not be objected to, viz., that much of the wine is badly made, the fermentation being left incomplete, and is therefore injurious in a very high degree.

Postponing for the present the consideration of inferior wines, the enquiry has to be made what claim the best of our colonial wines has to be regarded as a wholesome and innocuous beverage, the use of which ought to be encouraged.

It may be freely admitted that from the vigneron's standpoint the assertion is just, that Australia can produce excellent wine. But after all, this is only a question of degree. His standpoint and ours are essentially different. He assumes that alcoholic wine is good, and yet often argues, not very consistently, that the less alcohol it has, the better. We, on the contrary, assert that it is bad, and all we can concede to the purest and best colonial wine is a lesser degree of harmfulness than some other liquors. The abstainer may unite with the vigneron in denouncing the fabricated wines of Europe as vile decoctions. He may join in condemnation of the new, ill-made, and brandied wines of this colony, but can go no further in his company. We accept willingly, and employ gratefully, the vigneron's testimony thus far; but when he sets up as an advocate of temperance, we are tempted to enquire "is Saul also among the prophets?" When the vendor of colonial wine describes his wares as wholesome and innocuous, we cannot but suspect his knowledge, candour, or sincerity; and when he recommends as the pure unadulterated juice of the grape, a liquor which is from a quarter to one-third the alcoholic strength of proof spirit, we simply laugh at him. Let the manufacture be as perfect as it may, the added spirit little or much, the most that can truthfully be said of the best colonial wine is, that it is less injurious than something else. This faint praise may be unhesitatingly given, and the manufacturers of colonial wine are welcome to make the best they can of it. Until alcohol itself can be shown to have a direct value as an article of food, Australian must share in the verdict pronounced on other wines, that of positive excellence they have absolutely none.

It is scarcely possible to conceive of a greater fallacy than is embodied in the description of any fermented wine as the pure juice of the grape. I have had it pressed upon me in those very words, as though the fruit of the vine had by some natural process been preserved totally unchanged. Occassionally, those who reject it are accused of undervaluing the good gifts of nature. Such remarks can never be honestly made by those who have any knowledge of the chemistry of wine. Grapes are changed into wine not by a natural process of preservation, but by one of decomposition. Nor is the process natural in any sense. It is caused and arrested, controlled and guided, hastened and retarded by human skill for the conversion of nutrition into poison. The fruit of the vine is the gift of God, but its conversion into intoxicating drink would never take place by the act of nature; it is the handiwork of man.

Different and widely-varied theories have prevailed as to the cause and nature of fermentation, but one chemical fact has long been ascertained, viz., that the decomposition of sugar by fermentation produces carbonic acid and alcohol. Professor Mulder says—"Fermentation is in the first instance the consequence of the conversion of albuminous matter (be it vegetable mucus, or vegetable albumen, or both), into a body which is soluble in water, insoluble in alcohol, and contains far more oxygen than the substance out of which it is formed." A memorandum on the subject of ferment has been kindly supplied to me by Mr. G. Francis, the Government analytical chemist of Adelaide. He says it is only lately that the true principles of fermentation have become understood. All the results are caused by the vital action of minute organisms, vegetable in their character, and many of them allied to the Algæ, such as the Vibriones and Bacteria. The various ferments are divided into two classes, catalytic or chemical, and organic or living things. The first effect a change by chemical action, acting as media or agents of transfer, and do not cause consumption, or in other words they do not provoke or cause slow combustion by causing oxidation. The living things of the second class consume and cause oxidation by their vital action, and so by their vital action digest, as it were, the pabula on which they exist, the same as larger animals or plants consume food or grass, as the case may be. For instance, the small unicellular plant that causes the fermentation of alcohol in beers, wines, and such like, gets nourishment from the sugar in form only of glucose—grape or fruit sugar, and not of cane sugar, which is unfermentable until by the action of diastase it has become what is called inverted into glucose. Glucose in combination with albumen or other nitrogenous matter, affords then the pabulum for the yeast-plant, the germs of which exist in the air in inhabited places. These germinate, and consuming the glucose grow and assimilate nitrogen, carbon, &c., besides phosphate, and give off as exudiæ alcohol and carbonic acid. The latter escapes as gas, causing the effervescence of such fluids, and the alcohol remains in solution. These small cells that constitute the plant, multiply by sprouting or budding, and when dry by bursting and giving off invisible sporules to the air. They also produce sporules in the fluid as well as in the air. Other ferments of this second class act in the same way, but each give rise to their particular product, often an alcohol, but sometimes an acid."

In a paper on alcoholic fermentation read before a meeting in Adelaide, M. Bourbaud, after describing various theories as to fermentation, thus describes the principal phase:—"If we expose to the air at a temperature of above 59 deg. Fahr. the must from ripe grapes, there is soon after produced in the mass of the liquid transformations and apparent phenomena very easy to recognise. This liquid, at first nearly clear, becomes agitated and decomposed after some hours; the sugar and the azotic-albuminous matters change and modify themselves at the same time; the sugar begins to disappear; the azotic-albuminous matters are transformed; in the form of globules, living organisms are developed and multiplied, and extract from the substances which are dissolved in this liquid the necessary materials for their development and existence. The certainty of this production of phenomena in the fermentation is so great that there is nothing needed to provoke it. In this liquid a multitude of little bubbles are formed of colourless gas, tart, suffocating (carbonic acid), which becomes more and more abundant, rises to the surface, and forms by degrees a thick froth, which threatens to overflow the vessel containing it; it is the carbonic acid which is given off. The liquid appears to effervesce spontaneously; the temperature rises; by degrees the density of the must diminishes; the sugary flavour disappears, and is replaced by quite another characteristic—the vinous flavour—due to the presence of new substances which did not exist before, especially alcohol. Soon the fermentation itself will stop naturally in consequence of the disappearance of the elements necessary for its maintenance. If now we suppose this operation is made in a warm country, and with musts very rich in sugar and in azotic albuminous matters, then the quantity of alcohol produced would be about 31 to 31·3 per cent. of proof spirit. The development of the globules already existing would be stopped; the germs in contact with the liquid would be destroyed; the azotic-albuminous matters would be coagulated and precipitated, and would drag with them the greater part of the ferment, of the bitartrate of potass, of the tartrate of lime, and some small quantities of sugar which would be found in the lees, &c. At this moment the tumultuous fermentation (the fermentation properly so called) would be finished, the wine would be made."

The terms employed in this description are strikingly suggestive of radical changes. Transformation, production, development, decomposition, coagulation, precipitation, and destruction are all referred to. It will be noted that M. Bourbaud's incidental allusion to the living organizations which are developed in fermentation, is in strict accordance with the more complete statement of Mr. Francis. His reference to the chemical change produced in the liquid is also scientifically correct, as far as it goes, but it does not profess to be exhaustive. His evidence as to the complete alteration which fermentation produces in the fermenting liquid is, however, peculiarly valuable on account of his earnest advocacy of Australian wine, and his position as the representative of one of the largest wine selling companies in Adelaide. Undoubtedly he is too candid as well as too learned to deduce a false inference from his premises, but scores of consumers are still deluded with the idea that good colonial wine is wholesome and innocuous, because it is the pure, unimpaired juice of the grape. How widely the manufactured article does actually differ from the natural product M. Bourbaud himself has shown us.

More elaborate accounts of the changes produced in the must are easy of access, and they still further strengthen the argument. Professor Mulder, in his "Chemistry of Wine," after a careful investigation of the theories held by Stahl, Liebig, Gay-Lussac, and many others, gives the following instructive dissertation on the difference between the constituents of grape-juice and those of wine considered in connection with fermentation:—

"The formation of ferment diminishes the gum or vegetable mucus in the grape-juice, and renders it insoluble, in which state it composes the walls of the ferment cells, and the juice becomes turbid. In this manner vegetable gluten and vegetable albumen (substances contained in the grape pulps) are withdrawn from the juice, and enclosed in the cells. But during the decomposition of ferment the cells are emptied and sink as sediment to the bottom, their albuminous contents undergo decomposition, and some of the constituents are retained in the wine, in a soluble form. During fermentation the liquid becomes turbid, and this result we ascribe to the formation of ferment. But as soon as alcohol is produced from the sugar contained in it, the power of the liquid to hold different substances in solution undergoes a great change.

"There is a diminution first in the mucilaginous and saccharine contents of the juice, then those substances decrease which are insoluble in common water, but which can be held in suspension when in a fine state of division; for example, phosphate, sulphate, and lactate of lime. If, therefore, the gum serves for the formation of ferment, and the cellulose and sugar be resolved into alcohol and carbonic acid, then the liquid which was rendered turbid at first by the formation of ferment, will continue so during fermentation, because the phosphate, sulphate, and tartrate of lime are being continually precipitated. The result of this process is an alcoholic instead of a watery liquid. Cream of tartar is much less soluble in weak spirit than in water, and this is a third cause of the turbidity of the juice, which is gradually becoming resolved into wine. The continual increase of the quantity of alcohol in the liquid causes the precipitation of sulphate of potash and tartrate of magnesia, or tartrate of potash and magnesia.

"The separation of these substances increases proportionately to the increase of alcohol and continues till fermentation is at an end. These substances at first make the wine turbid, but speedily deposit themselves at the bottom as a crust, and form raw tartar.

"Young wine contains, therefore, less of the salts which have been mentioned than the grape juice from which it is produced, and the poorer the wine is in gum and sugar, and the richer it has become in alcohol, the smaller will be the proportion of these salts—namely, phosphate, sulphate, and tartrate of lime, double racemate of potash, sulphate of potash, and tartrate of magnesia. At the same time the albumen and the gum (the latter in the form of cellulose), are separated, and appear partly as ferment; and in place of the albumen which, after being converted into ferment, is afterwards decomposed, the products of that decomposition enter into wine in the shape of extractive matters, with the nature and quality of which we are at present, however, but imperfectly acquainted.

"Braconnot is the only person who has analysed the sediment which first forms in wine. It is a mixture, in which both the above-mentioned salts and the ferment, which has been separated, occur. He found 21 per cent. albuminous matter, more than 61 per cent. cream of tartar, besides 5 per cent. tartrate of lime, 6 per cent.

phosphate of lime, 2 per cent. sulphate of lime, the rest alumina; and moreover, a white, greenish, wax-like fat was found in this liquid.

"In conclusion, I cannot suppress the observation that ammonia being developed during the formation of ferment, and magnesia and phosphoric acid being found in the grape juice, phosphate of ammonia and magnesia must be precipitated, and the wine, therefore, will contain much less phosphoric acid and magnesia than the grape juice.

"By the time the first fermentation, which lasts from ten to fourteen days, is complete, all ferment has disappeared from the surface and sunk to the bottom with the above-named salts. The wine is now transferred to other casks, in which it undergoes slow fermentation.

"The wine, when drawn off, is far from clear, as the ferment cells floating in it render it turbid. It is not, however, these cells which keep up after fermentation, but their contents, which, having exuded through the cells are found in young wine in a soluble form, and produce fermentation.

"It follows necessarily that the deposit formed in the wine during after-fermentation is quite unlike that which is produced during the first few days. Much less albuminous matter is mixed with the salts, and it consists of what is known as raw tartar. Its principal constituents are, indeed, salts which have been separated in consequence of the increase of alcohol in the liquid; salts which are therefore insoluble in alcohol. In red wine a portion of colouring matter is withdrawn by these salts, which is thus rendered less astringent and of a lighter colour.

"The tannic acid is precipitated with other substances which were held in solution, and in order to prevent them from being brought within the range of decomposition (which happens when the admission of air changes the tannic acid into apothema, and sets free the albumen, whereby a new spring of chemical action often injurious to the wine is set free) the wine during after-fermentation is several times transferred to other casks, and so freed from sediment. The transfer into fresh casks must be repeated so long as deposit of raw tartar forms. The wine cannot be bottled until this ceases.

"In these respects the wine differs from the grape juice out of which it is prepared."

It cannot fail to strike the reader that the differences thus pointed out are both numerous and important. The three authorities which have been cited, though varying in their modes of statement, are in entire accord as to the main question. The statement of Mr. Francis shows how fermentation is caused, Professor Mulder's dissertation treats chiefly of the effects it produces, and the luminous remarks of M. Bourbaud may be regarded as linking the two in one connected paragraph. It is perfectly evident that in no case is there anything like intentional hostility to alcoholic wine. Their testimony cannot, therefore, be called in question on that score. Unitedly their evidence forms a complete and crushing refutation of the claim of such wine to favourable regard on account of the source whence it is derived.

It will be convenient to present the effect of fermentation in a tabular form, so that it may be seen at a single glance how little of the grape is left in the purest and best of wine when fermentation ceases. The following table has been published by Mr. Frank Wright, manufacturing chemist, of London, and strikingly evidences how completely decomposition takes place in wine-making:—

The Component Parts of the Fruit of the Vine Unfermented.	The Component Parts of the Alcoholic Liquor into which the Fruit of the Vine is changed by Fermentation.
GLUTEN GUM AROMA	*Alcohol* *Acetic Acid* *Œnanthic Ether* *Extractive* *Bouquet*
ALBUMEN	*Albume*N
SUGAR	*Suga*R
TANNIN	*Tann*IN
TARTARIC ACID	*Tartari*C ACID
MALIC ACID	*M*ALIC ACID
POTASH	*Pota*SH
LIME	*Li*ME
SULPHUR	*Sulp*HUR
PHOSPHORUS	*Phosp*HORUS

The following is Mr. Wright's explanation of this table:—"The reader will observe at the top of the left column in capitals the names of three constituents, GLUTEN, GUM, and AROMA, which do not appear in the right-hand corner. These are the constituents of the grape which are wholly destroyed by fermentation.

"At the top of the right column will be seen in italics five constituents, *Alcohol*, *Acetic acid*, *Œnanthic ether*, *Extractive*, and *Boquet*, which are not constituents of the grape, and do not appear in the other column. These are entirely new products, generated at the expense of the three constituents of the left column, which have been destroyed by fermentation.

"Other constituents appear on both sides. The introduction of the italics on the right in place of capitals on the left is intended to indicate that the *proportions* of the constituents in which they occur have been materially diminished in the transformation of grape juice into alcoholic liquor."

Thus it will be seen that by a triple process of destruction, addition, and abstraction, resulting from fermentation: *grape juice* *loses all the essential* qualities of "THE FRUIT OF THE VINE." It should be specially noticed that, in parting with its gluten and gum, and with nearly the whole of its sugar and albumen, the nutritive and life-sustaining qualities of the fluid are destroyed, for it is to these constituents that grapes owe their value as human food.

THUS IT IS DEMONSTRATED THAT ALCOHOLIC WINE IS NOT THE FRUIT OF THE VINE.

The mere alteration which has been so fully described, would be of less consequence were the resulting product useful, or even harmless. It derives much of its importance from its exceedingly prejudicial character. Not only are valuable constituents lost, their place is chiefly usurped by that prolific agent of evil, alcohol. This fact has a special bearing on our present subject, for it is a speciality of what are called the natural wines of Australia, that they are peculiarly rich in alcohol. The nature of the climate is favourable to the development of grape sugar, and hence the natural strength of the wines of Adelaide is greater than most of those produced in Europe. This fact has greatly troubled vignerons and even statesmen. The British tariff imposes on wines containing more than 26 per cent. of proof spirit duties so heavy that Australian wines, being usually above that standard, are placed at a considerable disadvantage. English experts have asserted that this excessive strength is due to added spirit, a charge which the producers indignantly deny. A commission was appointed by the South Australian Parliament in 1874 to enquire into the alcoholic strength of colonial wine, with the view of putting its case fairly before the British Government. In order to test the matter, seventeen samples of grapes were submitted to three analytical chemists. The returns of two of them—Messrs. Thomas and Cossins—closely agreed, and showed an average of proof spirit of 28·419 per cent. The returns of Mr. Francis were considerably higher, and gave, as the average of the seventeen samples, by one method 35·691 per cent., and by another, 34·128. At the same time, 12 samples of "natural unfortified wines" were tested, the result being that seven were over the standard of 26 per cent., the lowest being 22·8 per cent., and the highest 38·7. In the report of the Commission, the evidence thus obtained is held to prove, "that South Australia is capable of producing full-bodied wines of a high order; and that the statement long since made, though not everywhere believed, has foundation, namely, that South Australian wines *naturally excel in alcoholic strength.*"

Surely in this case we have a Daniel come to judgment. I thank the Parliamentary Commission for teaching me that phrase. Henceforth let it be known throughout the length and breadth of the colony, that the highest possible authority has declared South Australian wines to "naturally excel in alcoholic strength." The use designed to be made of the fact thus elicited and solemnly reported to Parliament, was of course to aid in removing the disabilities under which our winegrowers suffer in introducing their wares to the British market. This need not concern us, and the fact tells in quite another direction. Admitting all that can be said about the greater harmfulness of added spirit when compared with that produced by ordinary fermentation, admitting, too, that the wine is free from adulteration, the naked and ugly fact remains, that the wines of this colony contain an amount of alcohol which must of necessity render them highly intoxicating, and therefore highly pernicious. Perhaps they are not so bad as some imported wines, but this is at most only a negative recommendation. Their condemnation is pronounced in the verdict that they "naturally excel in alcoholic strength."

It is sometimes said that age is the one essential thing required to render the wine unimpeachable; but certainly the report does not support this theory. Among the samples of wine tested was one from Charles Bonney, Esq., S.M., concerning which the following letter appears in the appendix. It is worth while copying in full:—

"North Adelaide, 12th May, 1874.

"Sir—The sample of wine which I left with you, marked 'Verdeilho—Burnside, 1867,' is the produce of the Verdeilho grape, grown at Burnside, on a very poor limestone soil. The grapes were allowed to get dead ripe, and the wine, after the active fermentation had ceased, was put into a cask, which was about three parts filled, and remained untouched for six years. It was then fined with the white of egg, and this is the only process it has undergone.

"Having been in my own custody the whole time, I am able to affirm that the wine is pure and unfortified, and that whatever percentage of alcohol it may contain is the natural produce of the grapes of which it was made.

"I am, &c.,
"CHARLES BONNEY.

"Mr. E. B. HEYNE,
"Secretary to the Royal Commission."

Nothing can be desired more clear, precise, or satisfactory than this; yet this charming, six-years old, unsophisticated child of nature actually gave the highest percentage of proof spirit of the twelve samples! The next to it was a Madeira, grown at Walkerville, five years older, which contained 33·9 per cent. of proof spirit, but this innocent specimen from Burnside contained 38·7 per cent.; being, according to Gilbey's circular, as strong as Port, and just about three-fourths the strength of brandy. Such facts as these scarcely quadrate with the theory that the generous, naturally strong wines of South Australia are wholesome and innocuous beverages, the general consumption of which is calculated to promote national temperance.

In addition to the more than doubtful character of colonial wine, there is the awkward fact admitted by vignerons themselves that it is customary to largely fortify it with spirit of local distillation. The reason for this is not far to seek. The vitiated taste of the public demands it. There are skilled manfacturers here who know it pays them better to gratify the popular demand than to reform the popular appetite. They could and would dispense with such adventitious qualities in the liquor they produce were it equally saleable; but it is a matter of business after all, and therefore while lecturing the public on its bad taste the taste has still to be considered. The late Dr. Kelly showed me not long since a wine which he described as pure, natural, and possessing most excellent qualities. He said any quantity of it could be made, but there was no sale. He had pressed a large manufacturer, whom he named, to produce a wine of that description, and been met with the question, "How many customers can you get me for it?" Two or three were named, and the manufacturer replied that for every single one he could get a hundred who would prefer it made and fortified in the ordinary way. It seems pretty certain that so long as stimulants are craved for, colonial wine compared with imported, and its excellence judged of by old-fashioned standard, the present state of things is likely to continue.

An amusing instance of supposed excellence being found in supposed similarity to imported wine is furnished in a letter which I received in answer to some enquiries I made concerning colonial wine from a gentleman whom I believed to possess considerable experience in its use. He says:—

"Some years ago I was passing by Mr. ———, the watchmaker's shop, and he called me in. He said, 'I am going to give you something that will do you more good than the poisonous compounds they let you have at the public-houses. Will you take a glass of genuine port wine?' 'With great pleasure,' I replied. Mr. ——— then sent down a shopman to fetch a glass cupful up. 'Smell that!—look at the bead!—see the colour!—now taste! Does not that thrill through you? Do you not feel it at your fingers'-ends tingling?' I pronounced it very good, and told him *I thought I could do another*, and asked him if it was genuine port? 'That is nothing more,' he replied, 'than colonial wine, the pure juice of the grape, kept for six years. But it loses immensely by evaporation.' By a rather cunning look on the part of his assistants, I thought I could account for the 'evaporation.'"

This characteristic incident clearly shows in what respects the superiority is generally assumed to exist. The wine to be popular must resemble doctored port or fabricated sherry. It must thrill through the whole frame, and send a tingle to the tips of the fingers; or, in other words, it must possess abundant alcohol.

If it be said that light and weak wines can be made which connoisseurs approve, the answer is—the public are not connoisseurs. They want a drink of full flavour, sweet and fiery, and condemn other liquor as worthless and wishy-washy. In this section the least exceptionable of our colonial wines have been kept steadily in view. Care has been taken to obtain evidence from unimpeachable authorities. That evidence is now before the reader, and he will not have much difficulty in pronouncing the verdict. When all is said in favour of "pure natural wine" that can be said, that fact remains—that it is not a natural product of the vine. By the artificial process of fermentation the valuable qualities of the ripe clusters are destroyed and transformed. In their stead there is produced and substituted the agent of intoxication—alcohol, the demerits of which have already been discussed. In view of this fact, with the added speciality that South Australian wines are peculiarly strong even without admixture, to assert that their general consumption will promote temperance is a superlative absurdity, and to call them wholesome and innocuous is a wanton perversion of language.

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CHAPTER VI.

INFERIOR COLONIAL WINE.

Positively and highly injurious—Good the exception, bad the rule—Cheap cannot be good—Two faults: (1) Imperfect fermentation; (2) Fortifying—Added spirit worse than combined—Spirit often deleterious—Bad wine specially fascinating—A case in point—Continental experience no guide—Argument not undisputed—Mistaken legislation—Commissioner Hamilton on wine licenses—Medical testimony on effects of drinking common colonial wine—Effects on the community—Magisterial testimony—Specimen instances—Ministerial testimony—Rev. J. Nicholson, Rev. J. G. Wright, Rev. J. Watsford (Victoria)—Concluding witness, a victim.

Lest the argument should be prejudiced by any apparent tendency towards exaggeration, the case of the soundest and best colonial wines has been discussed separately from that of those which are confessedly inferior. These, however, are by far the most abundant, and in some respects therefore the most important. With regard to them, the negative form of objection may be unhesitatingly abandoned, and the position assumed that they are positively and highly injurious. This position will not be difficult to establish; it occupies an important place in the general question, and is of great interest to the entire Australian community.

The admission has been freely made that Australia can and does produce as good—that is to say as harmless—wine as any country in the world. Notwithstanding this possibility, it is absolutely certain that the common and cheap wines of these colonies are, of all liquors habitually and largely consumed, unmistakeably the worst. This assertion is not made on the authority of Good Templars and Sons of Temperance, but of competent judges of all kinds. Vignerons deplore alike the fatal facility with which an apology for wine is made by unskilled manufacturers, the absence of restriction on its sale when in a state unfit for human consumption, and the depraved taste of those who habitually use it. Such testimony is unquestionable. However bad we may consider the best colonial wine, the ordinary and inferior varieties are a hundred-fold worse.

This subject is the more important when it is remembered that good wine is the exception, and bad the rule. If the best wine were the most easily made, the cheapest and easiest to get, and the most popular as well, inferior wine would be of small importance in this discussion. But the case is exactly the contrary of all this. Winemakers may talk as they please about the virtues of natural and unfortified wines, but they know quite well there is no general demand for them, and in most of the wine in the market there is more or less of added spirit. Self-styled temperance reformers may extol as a summer drink light and sub-acid wine, or wine diluted with water, but it is all in vain. They may complain of the fiery or turbid liquor used as home-made, or sold as harvest wine, but while it retains its fascination, can be made so easily and sold so cheaply, they cannot beat it out of the field. It is impossible to speak with absolute certainty, but my own impression, based on careful enquiry and extensive observation during a residence in various parts of this colony of nearly thirty years, is that inferior wines and wines that are downright bad are far more largely consumed than those which have any pretensions whatever to excellence.

It has been pithily put that the great evil of colonial wine in wine districts lies in there being so much of it. It can be made almost as easily as sugar-beer, and is sold for a mere trifle, or perhaps drunk by the makers before the process of fermentation is completed. Were it as difficult to obtain, or as costly as beer or brandy and water, it would soon lose the bad pre-eminence it now possesses. Dr. J. Burney Yeo, in the article which he has previously referred to, says "it must not be expected that cheap wines can be good wines. There are a great number of persons always ready to give good prices for good wines." The same fact exists here, although its operation and results are different. There is the same demand for a wine which shall be cheap while at the same time it is highly stimulating. To produce good wine requires great skill, much labour, and expensive appliances, and it is simply impossible for manufacturers who are anxious about the quality of their wine to compete with those who are less scrupulous, especially when they receive so little encouragement.

Two faults contribute to the deleteriousness of inferior wine; want of care or skill in the manufacture, and adulteration with added spirit. Sometimes both of these occur together, but either is bad enough, even if alone. Writers on the chemistry of wine speak of the slow fermentation which succeeds the active process, during which there is a further deposit of the salts previously held in solution. In this part of the operation, as M. Bourbaud says, the wine completes itself, but many wine-makers, and especially those who cater for local consumption, do not wait for this completion. By the use of liquor in which the fermentation is incomplete, certain injury is sustained, and serious risk incurred. Some years ago a man died near Tarlee in a drunken debauch, which had culminated in his drinking what was little more than the washings of a wine cask. An inquest was held, and the surgeon who conducted the *post mortem* examination, told me he had no doubt the man was poisoned with the lees of the wine. This was of course an exceptional case, but the product of incomplete fermentation is always prejudicial to health. The salts in such wine are said to have a tendency to produce gout and rheumatism; the sugar causes acidity, and the incomplete fermentation has to be finished in the wine-drinker's stomach, to the detriment not only of that important organ, but of his whole physical economy. To this may be attributed the frenzy rather than intoxication which accompanies, and the cruel headache, with other derangements, following upon a bout of colonial wine.

To the second common characteristic, a host of evils is attributable. Notwithstanding the high alcoholic nature of Australian wine, the practice of fortifying it makes it still stronger. About this fortifying, three things have to be noticed. First, as alcohol itself is so injurious, an increase of this baneful ingredient means augmented power for mischief. Second, the addition of spirit is far worse in proportion than the mere generation of a higher percentage of spirit in the course of fermentation. Third, the spirit used is commonly of a coarse, bad, deleterious character.

It is unnecessary to dwell on the first of these points, as alcohol has already occupied our attention. With regard to the second, some remarks of Mr. Redding are so appropriate that I shall simply transcribe them. He says the natural alcohol of the wine is not deemed sufficient. Wine, often containing much brandy naturally, is strengthened by the artificial mixture of an enormous quantity which is raw, and which never combines in the natural way with the wine itself, notwithstanding the practice of "fretting in" by the maker. To this adulteration the injurious effects of mixed wines on the constitution are mainly attributable. How this difference between combined and uncombined alcohol happens, baffles the research of science to explain, but it is sufficient to know that such is the incontrovertible fact. Among common wine drinkers it is the alcohol of the wine alone that gives a momentary elevation to the spirits, not at all different in its nature from that which brandy mingled with water will afford, and re-acting heavily. Brandied and adulterated wines are the bane of Englishmen, though the effects may be slower in some cases than in others; while, in like manner, diseases may not be so obvious that really owe their origin to them. In wine mingled with brandy, the exhilaration is the first access of a fever, and the head and stomach suffer severely for the indulgence, not to comment upon the certain ruin to the constitution of the individual who follows the constant use of such wines, without taking them to excess, in the shape of indigestion, and ultimately of apoplexy or dropsy. The foregoing sentences are collated from three or four pages devoted to a consideration of the alcoholic principle in wine, and copied word for word. Gathered into one paragraph they form as emphatic a condemnation of the practice of fortifying wine as can be desired. They are so pertinent to the point at present in hand that they might have been written with direct and special reference to Australia.

As to the third of the facts above-mentioned, it is not the common practice here to use any other than vinous spirit, but this, by careless distillation, is often heavily charged with deleterious substances. It is usually produced from the refuse of the vintage, and the statement already quoted from "Gossip about Wines," shows that essential oils, "which are rank poison," are liable to "pass over" in the process. Without a doubt such oil does frequently pass over. Spirit that is only intended for fortifying is not likely to be so carefully prepared as that which is designed to be drunk as brandy. As a matter of fact wine-tasters have told me—the late Dr. Kelly among others—they have distinguished the peculiar flavour of this heavy coarse spirit in common colonial wine. By whatever name it is known, this fusel oil or amylic alcohol is a most deleterious constituent of any liquor in which it is present; and it is rarely absent from cheap colonial wine.

Dr. Richardson says of fusel oil:—"This heavier alcohol is used in adulteration, and as you will learn when you hear of its effects it is a dangerous adulterant. I was dining a few months ago with some friends, one of whom produced a small flask of precious liquor he had had presented to him, and which was said to be an unusually choice hollands. On examining it I felt sure it was a gin treated with fusel oil, and on burning a little of it, this suspicion was confirmed by a deposit of carbon upon a white dish. I warned my friends forthwith of the danger of drinking this heavy, though certainly pleasant, spirit, and the majority took the warning. Two, less prudent, indulged, to suffer for the next two or three succeeding days to an extent that convinced them there was no mistake in the scientific and friendly admonition they had received." The scientific verdict on inferior colonial wine must therefore be one of severest condemnation, whether its viciousness be regarded as due to its immaturity, its adulteration, or both.

It is a remarkable fact that bad wine exercises a peculiar power of fascination. In this respect it resembles other disease-producing and death-dealing liquors. A high authority once told me it did not pay for liquor sellers to recommend first-class drinks, for an inferior article always caused a greater demand. This appears to be the case with bad rum and "creamy" gin, as well as brandied wine. It is doubtful if any comprehensive explanation can be given of this singular fact, but the probable reason appears to be that such liquors excite the very craving they pretend to gratify, and thus the appetite is constantly increased. Possibly, also, the narcotic element has something to do with it, producing the well-known narcotic hunger. It is certain that the slavery of the confirmed smoker to tobacco, and of the opium-eater to his favourite drug, finds a counterpart in the fondness of the drinker of bad wine for his customary beverage.

As representing a multitude of similar instances, I may cite the case of a respectable farmer, who believed and said he could not endure the toil of the harvest without wine. He used it habitually, but without giving way to intoxication, until he came to depend upon it almost entirely, and it nearly involved his absolute ruin. Happily for himself, during one winter he broke the snare, and signed the pledge. When harvest came again, he determined to give his new principles a fair trial. He did harder and heavier work than he had ever done before, without using any stimulant whatever, and told me at the close he had never got through the season so well in his life. At the same time he confessed to the severity of the struggle which his confirmed appetite had caused him, for he said he "LOVED the wine better than anything else in the world." This, therefore, is another count in the indictment. Inferior wine exercises the fascination of the basilisk, while it poisons as cruelly as the asp.

So bad is the character, and so fatal are the effects of what may be called the *vin ordinaire* of Australia, that it is the blindest folly to encourage its manufacture, and facilitate its sale. "Gossip about Wine" says "history has clearly shown that nations using natural wines have been exceptionally sober." Even were this an undisputed fact it would not prove what it is intended to do with regard to these colonies. Both the tastes of the people and the wine the country produces, are widely different from those of the wine districts of Europe. Moreover the implied connection between cause and effect is utterly fallacious. It would be as justifiable to say that the inhabitants of Dorsetshire, whose principal drink is cider, are exceptionally sober, and therefore to plead for the superiority of this liquor to wine; whereas it is well known that its general use is followed by serious physical deterioration. The fact is, an almost endless amount of arrant nonsense has been said and written on this subject. It is as absurd to recommend imitation of Continental habits in drinking as in eating. Let those who extol them be consistent with themselves, and advocate the abandonment of Australian mutton and flour in favour of *soup maigre* and rye bread.

But the good effects of drinking these much-be-praised light natural wines is not undisputed. Smollett, who travelled through France and Italy a century ago, says—"All the peasants, who have wine for their ordinary drink are of diminutive size, in comparison with those who drink milk, beer, or common water. And it is a constant observation, that when there is a scarcity of wine, the people are always more healthy than in those seasons when it abounds. The longer I live, the more convinced I am that wine and all fermented liquors are pernicious to the human constitution; and that for the preservation of health, and exhilaration of the spirits, there is no beverage comparable to simple water." It is not essential to decide the matter either way, but this statement shows that little though the vaunted sobriety of wine countries proves with regard to our own circumstances, the fact itself must be taken *cum grano salis.*

Scarcely any legislation in South Australia has been a more unqualified mistake than that which has aimed at popularising colonial wine. This assertion, sweeping though it may seem to be, can be sustained by high and unquestionable testimony.

The following "Report on the Effect of granting Wine Licenses," was furnished to the order of the House of Assembly by Commissioner Hamilton, and ordered by that House to be printed, on November 25th, 1875:—

RETURN to ORDER of the HOUSE OF ASSEMBLY (MR. WIGLEY, 16th November, 1875), being REPORT from COMMISSIONER of POLICE, *re* EFFECT of the GRANTING of WINE LICENSES, &c., &c.

I cannot in any official return divide the separate cases of drunkenness into those that have occurred in wine-shops and those that have taken place in public-houses, but I have no doubt that the sale of colonial wine has increased drunkenness to a great extent, especially in the country districts.

Colonial wine has to compete with colonial beer, and to do so it must be made cheap, and to be cheap it must be sold so new that it cannot have matured sufficiently to be wholesome; in this state, when drunk in large quantities, as it frequently is drank, it produces a type of drunkenness which assumes a very dangerous character, and which often produces madness.

The police have the same control over the wine-shops as over public-houses; but as the public-houses are in populated districts, and the wine-shops are mostly in remote, out-of-the-way places, the control cannot be the same over the one as over the other—in short, wine-shops are set up where public-houses will not pay, and they thus become places where tippling can be carried on without being detected.

From what I hear and see, and also from what is brought officially under my notice, the object of the Act under which these licenses have been granted has not been met; and, instead of creating a pure taste for colonial wine, it has introduced an inordinate thirst for a most pernicious liquor.

Wine-shops were at first supposed to be an accommodation in a thinly-populated district, but in many places, instead of being an accommodation, they have become a curse; and unless the law is so far altered as to put further restrictions on persons taking out wine licenses, it is to be feared that the present system of selling colonial wine will become a serious evil. It frequently happens that a person will take out a wine license and leave the sale of the wine to his wife, while he follows his usual occupation away from his home; in such cases no possible control can be held over the drinkers, and disgraceful scenes are the consequence.

The keepers of wine-shops are not compelled to afford anything to the public further than to supply wine and vessels to drink it out of; their houses thus necessarily become drinking-houses only, and frequently they are nothing but the lowest kind of pot-shops, vending nothing but an intoxicating poison, and giving to the public no accommodation whatever. Of course there are different grades in this calling as in many others; but the liability of the highest grade falling to the lowest is so great that the community is always in danger of suffering from the evils these wine licenses create.

GEO. HAMILTON, Commissioner of Police.

Adelaide, 23rd November, 1875.

Extended comment on this exposure would be superfluous. It tells us that the sale of colonial wine has increased drunkenness to a verg large extent. It agrees with other authorities that new colonial wine produces a peculiar type of drunkenness, which is of an exceptionally dangerous character, and which often ends in madness. The liquor is aptly described as "pernicious," and one of its effects is the creation of an inordinate thirst for what is further styled "an intoxicating poison." The legislation which sanctions wine-shops is directly pronounced to be a blunder, and the wine-shops emphatically denounced as "a curse." Were these the observations of a temperance advocate, he would probably be accused of exaggeration. Happily this is a case in which no such accusation can be made. The Commissioner's calm judicial statements are as convincing as they are condemnatory. Such an unbiassed, damaging, and at the same time authoritative testimony against it, tears to shreds the vapouring of advocates for the general consumption of colonial wine.

If we turn our attention to the effects of viticulture on those who are immediately engaged in it, the case is only made worse. A case is before me at this moment, which is only a specimen of scores. This man was a farmer, healthy, well to do, and much respected. He owned a handsome property, good house, and lovely garden. He had an excellent wife, and a numerous family; in fact, was happy in all his surroundings. No man was more useful in his own neighbourhood, socially, politically, or religiously. Unfortunately, he turned his attention to wine making, and naturally drank of his own produce. A short time sufficed to effect a complete and most disastrous change. His fondness for wine grew till it became a passion. While the produce of the vintage lasted it seemed as if he could never let it alone. The consequence was that in a few years he abandoned his religion, shattered his health, soddened his brain, alienated his family, lost his property, and became a total wreck. He more than once threatened to murder his faithful wife and affectionate children, and they had repeatedly to flee from his attacks. He became an inmate of the Lunatic Asylum, and not till his farm and vineyard passed out of his possession, thus removing the cause of his ruin, was there any check to his downward career. This is not a fancy sketch, but in its principal features it applies to so many cases that it is not unlikely as many originals will be found for it as for Dickens' famous portraiture of the schoolmaster of "Do-the-boys Hall," and therefore there is the less reason for withholding the details.

Being anxious to obtain full and trustworthy evidence on the effects of drinking colonial wine, I have instituted a series of enquiries in various directions, the result of which shall now be laid before the reader.

Medical testimony from colonial practitioners appeared to possess a special value, and in order to elicit a definite expression of opinion I prepared the following series of questions:—

1. What effect does common colonial wine produce on general health when used as an ordinary beverage?

2. What are the physiological effects of excessive indulgence in such wine, especially on the brain and nervous system?

3. How do these effects differ from those produced by excesses in malt and spirituous liquors?

4. To what special characteristics of the wine do you consider they are attributable?

5. What is your opinion of the effect likely to be produced upon the community by the manufacture of cheap colonial wine, especially by the proprietors of small vineyards who are either careless or unskilled in the art of wine making?

To these questions two independent series of replies have kindly been furnished. It will be seen that despite their wide difference of structure, they substantially agree in sentiment. The first is from a medical gentleman of many years' experience in different parts of the colony, a portion of which time he spent in the centre of a wine-producing district. It was this circumstance which induced my application to him. I did not know anything of his views on the general temperance question, but believed he would candidly give his opinion, and considered it preferable to have it based on practical rather than theoretical acquaintance with the subject. His answers are as follow. The number prefixed to each answer will sufficiently indicate the corresponding question, as given above:—

1. (1.) Dyspepsia. (2.) Derangement of liver.

2. (1.) Irritation or even inflammation of brain. (2.) Nervous debility, or prostration, immediately following the excitement produced at the time of indulgence. (3.) Injury to coating of stomach. (4.) Hardening of liver.

3. Under the influence of malt liquor the patient is generally quiet, drowsy, and the effects pass off in a deep sleep; whereas under the influence of bad colonial wine the brain is excited, the

imagination quickened, and the worst passions are acted upon, and as a rule the patient is boisterous and troublesome.

4. (1.) The want of age. (2.) Being fortified with impure spirit. (3.) Alcoholic strength above what is necessary. The lamentable ignorance and want of proper appliances in many instances where wine is made in small quantities must be regarded as a fertile source of much evil.

5. (1.) A feeble progeny. (2.) Hereditary tendency to dipsomania. (3.) Increase of crime and immorality. The above conclusions may be considered perhaps rather sweeping, but they must follow sooner or later, and just in proportion as the parents indulge in the evil during those years in which they beget children.

It would perhaps be an impertinence, and certainly a work of supererogation, were I to comment on the statements of professional gentlemen at any length. Both the preceding and following remarks speak for themselves. It is only necessary to say, that the second series of answers is from a doctor of long colonial experience, high position, and unquestioned skill, who has had opportunities of observing the various effects of alcoholic drinks on the brain and nervous system, greater, perhaps, than that of any other medical man in the colony, and who is not a total abstainer. He writes as follows :—

1. The daily use of bad colonial wine as a beverage, has a tendency to interfere with the digestion, disorder the liver, and cause considerable irritability of temper.

2. Intoxication produced by bad colonial wine is worse than intoxication produced by sound liquor, as it causes much greater disturbance of the digestive system. There is more excitement of the brain, and the conduct is more disorderly and violent.

3. Excesses in sound malt or spirituous liquors are followed by less disturbance of the digestion, and consequently are more rapidly recovered from. The craving for further indulgence is always greater when bad liquor is the stimulant used.

4. It is in the newness of the wine that its badness lies. There are certain ethereal products from recent fermentation, perhaps analogous to the fusel oil in potato spirit, which are volatilised by time, whose effect on the nervous system is pernicious, almost poisonous. All excess in drinking is bad, but the evil effects of excess are increased a thousand-fold by the badness of the liquor.

5. The manufacture of wine in this colony by the owners of small vineyards should be discouraged. The product in any case can only turn out good by an accident. Generally, it is a most deleterious article, incapable, if it were kept for ever so long, of turning out good, and is very often drunk before it is six months old. The spirit it contains is raw and mixed up with grape sugar and vinous salts undergoing chemical change. When drunk to excess it has a maddenning more than an intoxicating effect, and in small quantities

depresses rather than stimulates. *The manufacture and consumption of such wine must be most demoralising to any community.*

To obtain further evidence on this important subject, and from a different point of view, I submitted question No. 5 of the foregoing series—(What is your opinion of the effect likely to be produced upon the community by the manufacture of cheap colonial wine, especially by the proprietors of small vineyards, who are either careless or unskilled in the art of wine-making?)—to a country magistrate resident in a wine-growing district. This gentleman worthily fills his position, is an old colonist, has cultivated observant habits, is widely known, and, I believe, universally esteemed. The question was accompanied by a request for illustrative cases that had come under his own observation. The following is his reply:—

Having been for many years resident in a district where wine-growing is carried on to a considerable extent, I have had frequent opportunities of observing the ill-effects arising from its common use. A large proportion of that consumed in country districts is in itself pernicious stuff, being made from the juice of various kinds of grapes in various stages of ripeness, all mixed together, and very often hastily and carelessly manufactured. Many cottagers and small farmers have each their small plot of vines, the produce of which, dignified by the name of wine, but without any of its generous qualities, is their regular beverage so long as the supply lasts. One reason why its effects are so injurious is, I suppose, its rawness or newness, being as a rule used almost immediately it is made, very often before it has ceased to ferment; indeed the whole process of fermentation, which appears to need great care, is unskilfully managed. Whether any of its deleterious properties would be dissipated by age I do not know, but am quite sure that the general consumption of new wine by the small wine-growers is a great evil. The fact is, as I have often heard them remark, "We can't sell it, and don't like to throw it away, so use it ourselves." I remember, a few years since, being offered by a farmer on a very hot day, a glass of wine. The liquor when drawn seemed rather turbid, and he remarked, "Oh! yes, it has not got clear yet, we only made it a fortnight since," and in that state he constantly used it. *That man has since died from softening of the brain*, accelerated, if not caused, by the liberal use of this unwholesome stuff, of which, especially during the hot weather, both he and his family drank largely.

I do not think, as a rule, that spirit is added to the wines made by these small producers, but their natural alcoholic strength must be very great, and I have frequently observed that they have a tendency to produce great irritability and pugnacity in those who freely indulge, instead of the heavy stupid kind of inebriety often occasioned by the immediate use of malt liquors. So far as my own observation goes, and in this I think I shall be borne out by most observers, the greatest evil connected with the drinking habits of the country is the free use of this inferior wine. It is cheap, always accessible, and seems instead of quenching to excite thirst, so that the quantity drank by many labouring men and others is very great, two bottles a day being a common allowance when working in the hay-field or at wheat harvest. I will just give an instance or two in my own immediate locality.

S. R., a farm labourer, with wife and one child, was industrious and steady, saved money, bought a cottage, and planted a few vines. Both he and his wife began to indulge in the use of the wine they made. Soon the appetite grew, and their own stock became insufficient. As they can buy it from their neighbours at about 1s. a gallon, a canful at a time—the licensing laws to the contrary being disregarded—they are now seldom sober. The wife has frequently been found lying in the fields with a jar of wine by her side, the temptation being too great to allow her to carry it home from the cellar where purchased before trying its potency. She has already suffered from one attack of paralysis directly traceable to this cause.

Their next neighbour, C. T., commenced in the same way, but finding the craving for drinking growing so fast, in a fit of virtuous resolution grubbed up his vines and planted potatoes! The contrast between the homes of these two men, and their personal appearance, as well as that of their families, is very marked. They live next door to each other, and usually work for the same employer, so the difference appears to be simply in this habit.

W. P., a carpenter, good workman, and able to obtain full employment; built a cottage, planted a vineyard, and drank its produce. Soon his trade was neglected and poverty followed. One night, during a drinking bout, he slipped from his seat to the floor. His companions were too drunk to take any notice, so there he lay all night, and in the morning when found life was extinct, his companion in the carouse stretched by his side in drunken sleep. The verdict of the Jury was apoplexy induced by intemperance.

I could multiply instances of desolated homes, ruined health, and life sacrificed by the free use of this colonial wine that have come directly under my own notice. There are not in my neighbourhood any licensed wine-shops, but I have heard from good authority that the results of their establishment have in many cases been very disastrous, and as I know that the growers of the dark "harvest" wines, as they are called, add a large quantity of spirit distilled from the skins and other refuse of the grapes to the already fiery liquor, and which are chiefly sold at these places, I can readily conceive that its free use must have a most injurious influence upon the brain, intellect, and health of its consumers, and should be glad to see such legislation as would restrict its sale and use.

The establishment of larger manufactories where the grapes could be purchased from the grower, and the wine prepared with skill and judgment, and allowed to attain maturity before being sold, would, I am convinced, go a long way to improve matters. At present there is no regular market for the fruit, and the growers, rather than waste it, make it into a beverage which, being in its turn unsaleable, they drink. Hence disease and weakness both of body and brain, and a long list of other evils, frequently resulting in untimely death.

From another magistrate of equally unexceptionable character, experience, and position, residing in another wine district in a different part of the colony, I obtained the following answer to the same question. (In this case I did not ask for specimen instances, fearing lest I should needlessly encumber my pages.) "It is my deliberate conviction, founded on many years of personal observation, that the manufacture and sale of cheap colonial wine has had a most deplorable effect on the community in past years, and I don't see any reason to expect that it will be otherwise in the future. I heartily wish the practice were entirely abolished."

The medical and magisterial testimony is fully endorsed by the clerical. I submitted the same question (No. 5) and request for illustrative instances to the Rev. J. Nicholson. He is a well-known and pronounced teetotaller, but his high character, prolonged and careful attention to the whole subject, and residence in a wine-growing district, invest his opinions with special importance. The following is his statement:—

Having laboured some years as a minister of the gospel in the centre of a vine-growing district, I have had ample opportunities for forming a decided opinion upon "the effect likely to be produced upon the community by the manufacture of cheap colonial wine, especially by the proprietors of small vineyards, who are either careless or unskilled in the art of wine-making."

The evils are so obvious and numerous, that I do not wonder at many of my brother ministers, and other philantrophic individuals, being imperatively led to adopt total abstinence principles, in order more effectually to rebuke this social evil.

I have known many small vineyards to be planted in the hope of being remunerative; but, alas, the practice of setting aside a proportion of wine for household consumption has led to habits of vinous intoxication of the worst kind; and financial embarrassment and ruin have followed, instead of commercial prosperity. When the craving for wine is thus created it is often gratified before the liquor is a fortnight old, and while active fermentation is still in progress. Many families have yearly to endure a period of domestic misery from this cause, and I have known several brave wives and mothers shorten their misery, and sober their husbands and sons, by spilling whole hogsheads of wine upon the ground in a burst of righteous indignation.

The practice of serving out wine at meals, as a common beverage to young children, or farm hands, obtains to an alarming extent. It is then consumed in quantities which indicate profound ignorance of its alcoholic strength and deleterious nature. I have met with several cases in which the children of wine-drinkers have manifested a decided and early partiality for the sin of their parents. Some young men have confessed to me a sense of bondage to this habit arising from inherited tastes, and an absence of all hope of amendment from the conviction that the passion for it was hereditary.

As a minister I have grieved over the moral evils wrought by following the example of Noah, who "planted a vineyard and drank of the wine, and was drunk." I have known many religious hopes blighted, many Christian characters marred, and much personal usefulness destroyed by indulgence in fermented colonial wine.

Out of some sixty cases which illustrate the disastrous effects of wine drinking which have come under my notice, I select the following examples:—

(1.) A.—The fruit of his vineyard was a yearly temptation to which he often yielded, much to the distress of his delicate wife. He became a Good Templar, and was much interested in the success of the movement. Has been known to walk over 20 miles to a Lodge meeting after his day's work. Violated his pledge with his neighbour's wine. Was so drunk when his wife died as to be unable to hand her a cup of cold water. Imbibes his own wine freely.

(2.) B.—Was once a zealous professing Christian, and liberal donor to benevolent objects. His large vineyard must be debited with his fall from Christian integrity. He is now seldom sober. Has fits of remorse when he contrasts his former happiness with his present misery. Has attempted suicide more than once.

(3.) C.—An old colonist who planted a vineyard on part of his land. Contracted habits of intoxication and thriftlessness. Sold portion of his property and drank the proceeds. Was subsequently induced to uproot nearly all his vines and plant potatoes instead, and is well satisfied with the change. Has been sober ever since, and is increasing in prosperity.

(4.) D.—A medical practitioner who was frequently asked to take wine in the houses of his patients, and was seldom known to refuse. Lost a good practice by reason of his vinous excesses, and has since become an object of Government charity.

(5.) E.—had good family connections. Took to wine drinking. Was nearly drowned by falling into a swollen creek when drunk; slept all night in his wet clothes, which induced a fatal illness in a few days.

(6.) F.—Was a confirmed drunkard before he was 21 years of age. From a boy helped his father to make wine, and to drink it. Has made several ineffectual attempts to be a teetotaller. Declares he must have inherited the taste from his parents, and regards himself as hopelessly and helplessly involved.

(7.) G.—Is supported by remittances from English relatives. Have never seen him entirely free from effects of wine. Of late years he has become almost idiotic, and is rapidly failing in general health. A sad case!

(8.) H.—Is a scholar, and was once a gentleman. Wine is ruining him body and soul.

(9.) I.—Was an accomplished lady, beautiful in person, vivacious and brilliant in conversation, and much admired in social circles. She easily contracted habits of intoxication from connection with her father's vineyard, and was cut off in the midst of her years, a large circle of friends sincerely mourning her untimely end.

Few persons in South Australia know more of the condition of its people than the Rev. J. G. Wright. His long experience and devoted labours entitle him to speak with authority, and to be listened to with respect. I requested a mutual friend to obtain his opinion of colonial wine for me, and shortly afterwards received the following, which does not need one word of comment:—

November 26, 1877.

My dear Sir—I have just sat down this morning and written a few things as they come to my mind, and have written them in haste. Not half the truth is told.

You can do as you please about my name. Had I more time, I could give you many cases more. *I have seen plenty to show me that the colonial wine is a curse.*

Yours truly,
J. G. Wright.

To see the effects of colonial wine, you must go to those localities where it is made, enter into the homes of the people, see their customs, and learn their habits. Just passing through a neighbourhood you will not see the sad effects of the fermented juice of the grape. You must go behind the curtains, and there you will find the old serpent doing his work secretly, but surely. For twenty-two years I have lived among the people, have gone to their homes, and I have seen the heart-rending scenes produced by colonial wine. Not quite ten miles from Adelaide, I spent most of a day in visiting from house to house, in a locality where the luscious fruit of the vine is the principal produce of industry. I did not enter one family but what I found one or more of the number in a state of intoxication. In one house a father, in another a son, in another a mother, in another both husband and wife. In one of these families I made my home. The father and mother had been for many years members of the Church of Christ. It had been the home of love and plenty; more lovely and loveable children I had not seen. But a vineyard was planted, and soon the wine was made. The father soon became a victim, then the mother, and at the end property was lost, the father killed by the influence of the wine, the whole family broken up and degraded. Not four miles from Adelaide I have seen family after family laid in the mire of intemperance. One lovely family, where for years I made my home, and loved the branches of that family as my own, I often admonished them, and told them what I had seen in other families as the effects of this insidious foe; but on they went, from little to much, not dreaming of any harm. The love of excitement increased, and not long the legitimate effects of fermented grape juice began to be developed. A lovely daughter was the first that fell a victim to the habits of a drunken father. Next, a son was driven from his home, disgraced and disgraceful. The father was expelled from the Church, became next hated and hateful, and but little better than a snivelling idiot. The mother sank beneath the trial, and, when dying, said to me, "Oh! Mr. ——, I am dying broken-hearted; my husband is killing me." The banished son, hearing his mother was dying, came home to see her. As the father came into the room, the son fell upon his knees to ask forgiveness, when the drunken father struck him in the presence of the dying mother. She died in grief, and the husband has since died. All this was the fruit of *wine*. About twenty miles from Adelaide, where vineyards were plentiful, I have seen whole families ruined. Visiting one poor dying woman, I was told by the husband that a neighbour came to see her; he left the room for a short time; when he returned, the woman who had come to spend a short time with his dying wife was pulling the poor dying woman out of the bed by the hair of her head. This was wine again.

In the same place there were two very kind and respectable families and owners of freehold farms. The old man planted a vineyard. Not many years afterwards the family began to show an undue fondness for wine. The son became a drunkard, the family was broken up, the farm sold, and all went to ruin. The other family lost all, and at this moment the father is roving about the colony not much better than a lunatic. This was all through colonial wine. In the same neighbourhood a minister of the Gospel planted a vineyard, and had high hopes of great prosperity. It was not long before the serpent bit him, and diffused its poison through his whole moral as well as physical nature. He with a brother minister drank freely, till they both degraded themselves. One was expelled from the Church, and the other suspended for a time. This, too, was colonial wine. Another family I knew well, and loved too, had six good valuable sections of freehold land. The head of the family thought he must be like the rest, and have a vineyard. He soon planted the vine, and by fermentation gave to the juice of the grape intoxicating properties which soon ruined him both body and soul. Within a few years all his land was sold, and he died in misery.

In these statements there is no exaggeration or redundancy. Not half of the truth is told. I have seen women in the most degraded condition in their own homes through wine. There are hundreds of such cases. My heart sickens while I write. When will men see the evils, and help to banish it from the homes of the people?

I have not thought it necessary to obtain elaborate information from the other colonies. The extracts from the Report of the Victorian Royal Commission of 1867, given on a previous page, show, however, that strong similarity exists between this and the neighbouring colony. In further proof, the following brief but comprehensive statement may be regarded as conclusive. It is furnished by the Rev. J. Watsford, who is intimately acquainted with both colonies, and whose name is mentioned everywhere with confidence and respect. He says:—"My own opinion, formed from careful observation, is that wine-making in Australia has been a great curse to many; especially, I think, when it is made in small quantities for home use, and is drunk when quite new. Many get into the habit of using it freely, making it their drink; children take a cup and go and drink it as they would water. The consequence is that men and women are generally under its stupefying influence, their health is greatly injured, and the children are being brought up in habits of intemperance."

While prosecuting these enquiries it appeared to me extremely desirable, if not essential to complete the circle, to obtain one additional testimony from an entirely different quarter. Having heard what the assailants of wine have to say, it seemed proper to listen to one of its victims. Medical men, magistrates, and ministers having united their voices in its condemnation, I felt anxious to elicit the sentiment of one who had experienced its fascination and come under its power. It was necessary that he should fairly represent the class of wholesale consumers, and be educated, intelligent, and candid. Accordingly I wrote a short note to a gentleman who appeared to me to fulfil the necessary conditions, requesting him to favour me with his candid opinion about colonial wine. His reply was prompt, frank, and conclusive, and I feel that he has laid both me and my readers under considerable obligation by thus freely expressing his sentiments.

A paragraph from his letter has been given where it seemed specially appropriate; the remainder of the part which directly relates to my special enquiry is subjoined. The italics are his own :—

Belair Retreat, September 11, 1877.

Dear Sir—I am in receipt of yours of the 8th instant concerning colonial wine.

My own special weakness has generally been beer and spirits, but I have also at times drank freely of colonial wine when in the bush. It seemed to me to have a more exhilarating, ethereal, and enlivening effect than other preparations of alcohol; but oh! the splitting headache next day! This effect is the most common result to, I believe, nearly all that indulge in it, as I have heard so many shepherds and bushmen complain they wish they had never drank that—(strong adjective)—colonial wine; and this has been the lament of those of healthier physical constitution and stronger nerves than my own. I believe this is, however, in a great measure to be accounted for by the wine being drank when it is new, and fortified with bad spirits.

The error in drinking colonial wine is—people say, "Oh, it can't hurt you; it is not like spirits; it is only the pure juice of the grape." But the morrow's retributive splitting headache more than equiponderates for the fascinating draughts of yesterday. *Scarcely any drink is more deleterious than new colonial-made wine.*

Yours, &c.

After this, surely nothing more need be said, unless it be to express a hope that those who still indulge a lingering weakness for colonial wine will give this phalanx of testimonies candid consideration and allow them to produce practical results.

SUMMARY.

The claim urged for alcoholic wine a fallacy—Not food, but luxury—Dr. Richardson—Sir Henry Thompson.

In concluding this branch of the subject, I appeal with confidence to the candour of every intelligent reader. On a review of the whole case, the conclusion is irresistible, that the claim of alcoholic wine to be regarded as an essential or healthful article of diet is an utter and complete fallacy. The valuelessness of alcohol for either food or fuel to the human organism has been clearly demonstrated. Space has prohibited any systematic enquiry into the crimes and diseases occasioned by its use; and this, indeed, is not the special subject before us. Enough, however, has incidentally crowded itself in to justify the sad apostrophe of poor Cassio after his revel was over—"Oh! thou invisible spirit of wine, if thou hast no name to be known by, let us call thee—devil." Volumes might be written on its banefulness. The Duke of Wellington was asked by Lord Wharncliffe—"Is drunkenness the great parent of all crime in the British army?" With military sententiousness and promptitude, the greatest captain of the age replied—"Invariably." A commission appointed by the Lords of the Admiralty to enquire into the use of spirits in the navy stated in its report—"The seamen without one exception admitted in their evidence that drunkenness is the prevailing crime on board Her Majesty's ships, and they acknowledged with equal frankness that drunkenness is the cause of almost every punishment." This side of the subject need not be dwelt upon. It clearly shows that if alcoholic wine is not a necessity its general use cannot be too deeply deplored. The series of propositions submitted in the introduction have been separately dealt with in the previous chapters, and the conclusions reached clearly show that to describe alcoholic wine as a valuable or even useful article of diet is a fallacy as baseless as it is mischievous. It has been amply proved that the chief general characteristic of ordinary wine is alcohol. This is its principal value and constitutes its chief attraction, yet is not food in any sense of the term. It is further evident that alcohol operates most injuriously on the human organism in a variety of ways, affecting different organs in a variety of ways, but so seriously as to justify its being ranked among poisons of the worst kind. Against the supposition that stimulants are desirable or necessary a list of testimonies have been given to prove that impartial and competent judges declare the belief absolutely erroneous. Wines in general have been shown to owe their popularity not to the excellencies of the grape, but to qualities demanded by vitiated taste and supplied by chemical skill. That colonial wine, even the best of it, is not, as sometimes declared, the pure juice of the grape is proved by the changes effected in fermentation. The character and effects of ordinary and inferior colonial wine are attested by medical men, magistrates, ministers, and others whose judgment is unimpeachable. The whole forms an exposure of the worthlessness of wine as an article of diet, which appears to me as complete as can be desired. Such a beverage cannot do good, and is certain to do harm. As food it is nowhere. As medicine it may occasionally be employed with advantage, but even then it is dangerous. Its only true position is that of a luxury; indulgence in which costs a disproportionate and exorbitant price. At the close of one of his lectures, Dr. Richardson remarks—"Whatever good can come from alcohol, or whatever evil, is all included in that primary physiological and luxurious action of the agent upon the nervous supply of the circulation to which I have endeavoured so earnestly to direct your attention. If it be really a luxury for the heart to be lifted up by alcohol; for the blood to course more swiftly through the brain; for the thoughts to flow more vehemently; for words to come more fluently; for emotions to rise more ecstatically; and for life to rush on beyond the pace set by nature; then those who enjoy the luxury must enjoy it—WITH THE CONSEQUENCES."

This declaration is fully corroborated by Sir Henry Thompson, than whom no one stands higher in the medical world of Great Britain. Writing to the Ladies' National Temperance Association he gives utterance to sentiments which strongly sustain the conclusions to which we have been led. With his deliverance our consideration of the fallacy he exposes may appropriately conclude:—

"*I am quite satisfied that fermented liquor of any kind is unnecessary as an article of diet.* For the few who may require a habitual alcoholic stimulant, it can only be considered as a medicine, and therefore should be so regarded. As with many other medicines, however, its employment is apt to be greatly abused; and thus wine or spirit is taken when not in the least degree necessary, often when it is absolutely injurious. For people who enjoy tolerable health, but nevertheless find 'digestion slow' or 'imperfect,' or the 'circulation languid '—popular forms of excuse for taking wine—it seems to me more frequently a dangerous snare than a tolerable remedy. *Let us all put alcoholic liquor in its proper place, namely, among the so-called luxuries of life, not among its necessities.* I am quite alive to the exquisite perfume of some rare old vintage, to the agreeable exhilaration which follows a moderate dose of good champagne. The fragrance of a fine cigar has for many people unquestionable charms—its soothing effect is often still more enjoyable. It is useless, it is not wise, to ignore the existence of these things; best natures have felt their influence, and may perhaps have paid some price for its enjoyment. But that is exactly the point I wish to insist on. *Don't take your daily wine under the pretext of its doing you good.* Take it frankly as a luxury, one which must be paid for, by some persons very lightly, by some at a high price, but always to be paid for. And mostly some loss of health, or of mental power, or of judgment, or of calmness of temper, is the price."

PART II.

PROFITABLE USES OF THE FRUIT OF THE VINE.

CHAPTER I.

THE VINE—ITS VALUE AND PRIMARY USE.

Prediction of Moses—Its literal fulfilment—Modern testimony—Resemblance between South Australia and Palestine—Appropriateness of description—The vine a blessing—Eulogy not inconsistent—Blessings may be perverted—Primary use suggested—Extent of viticulture in Australia—Industry not flourishing, but firmly rooted—Suitability of country—Climate—Best methods of utilisation—Uses in Syria and Asia Minor—Grapes useful for food—Culture will pay—Practical knowledge required—Means of preservation.

One of the last official acts of the prophet Moses was to rehearse their national mercies in the hearing of assembled Israel. The historical narration was designed to prove that they were a people specially favoured of heaven, and thus to confirm them in their allegiance to God. Concluding his retrospective sketch, the prophet further enforced his appeal by spreading before the eager multitude a graphic and glowing picture of the providential intentions concerning their future. "The Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains and depths that spring out of valleys and hills; a land of wheat, and barley, and vines, and fig trees, and pomegranates; a land of oil olive, and honey; a land wherein thou shalt eat bread without scarceness, thou shalt not lack anything in it; a land whose stones are iron, and out of whose hills thou mayest dig brass."

To the nomadic tribes who had wandered to and fro in the desert for many years, ever viewing the goodly land through a weary vista of hope deferred, this representation must have come as a vision of incredible delight. Vivid and charming though it was, we are assured that the solid reality was fully equal to the bright anticipation. When the people were ultimately settled in peaceful enjoyment of their long-promised heritage, it is definitely recorded that "there failed not ought of any good thing which the Lord had spoken unto the house of Israel; all came to pass."

A sad and depressing change has come over the country, but it still bears evidence that the sketch drawn by the prophetic hand of the Jewish lawgiver was true in every detail. Modern travellers confirm this. Dr. Thomson, whose forty years' residence in Syria qualifies him to speak with authority, says of a part of North Palestine:—"Certainly this is a good land; I have never seen a better." Another traveller, describing a journey in the South between Hebron and Jerusalem, says he was constantly reminded of the description which has been quoted from Deut. viii. 7-9. He further observes:—"The abundance of grapes which fell to Judah's lot no man can doubt who sees the country, even in its present deplorably neglected state."

The people who were put in possession of these blessings were represented as highly favoured. Their advantages were to be freely and gratefully enjoyed. It was announced that only when these good gifts were prostituted and abused would they cease to be tangible; and against this abuse, with the criminal forgetfulness of the bountiful giver, the most impressive cautions are urged.

Much in these references to the land which God selected for the national home of his peculiar people, promised to the Patriarchs and conferred upon their descendants, is of special interest to dwellers in South Australia. Travellers in both countries have often commented upon the striking similarity between them. Governor Eyre was accustomed to say that no two countries on the face of the earth were more alike than parts of this colony and the Holy Land. Of course the comparison does not apply to the colony throughout. Palestine is a narrow strip averaging about sixty-five miles in breadth, and one hundred and eighty miles in length, its area being reckoned at about 11,000 square miles; whereas South Australia, including the Northern Territory, contains 914,730 square miles. Necessarily, therefore, it presents a wide diversity of soil, climate, and natural productions. It is nevertheless true that of some extensive tracts, especially in the older and more settled districts, a more accurate description could hardly be given than that contained in the book of Deuteronomy.

No one can have traversed the hilly districts, especially if during the heat of summer he has just left behind him the scorched and thirsty plains, without feeling that he has been brought into "a land of brooks of water, of fountains and depths that spring out of valleys and hills." The fame of Adelaide wheat has spread throughout the world. Here, if anywhere, the staff of life even of the very poorest consists of "the finest of the wheat." A million and a half of acres have already been brought under cultivation, and our cereal produce is reckoned each year by millions of bushels. It is indeed "a land of wheat and barley." Vineyards spread along the slopes of our hills, and fig trees yield their luscious fruit with prolific abundance in our orchards. Side by side with dusky olives, pomegranates beautify our gardens, the intense green of their foliage contrasting well with their brilliant blossoms and scarlet globes. Where the eucalyptus blossoms earliest the air is alive with the humming of bees. From an apiary on the banks of the Onkaparinga I have known a ton of honey to be taken in a single year. No country is more truly "a land of vines and fig trees, and pomegranates, oil olive, and honey." The comparison holds with equal propriety in mineral treasures. Ironstone abounds, and copper is one of our staple products, justifying the description "a land whose stones are iron, and out of whose hills thou mayest dig brass." The enumeration reaches its climax, and the comparison retains its appropriateness in the words, "a land where thou shalt eat bread without scarceness, thou shalt not lack anything in it." South Australians may be pardoned a little natural enthusiasm if, when reflecting on this catalogue of temporal blessings, they feel that as regards the good things of this life, "the lines are fallen to them in pleasant places, and they have a goodly heritage."

Prominent among the creature comforts thus specified as provided both for Israel and for us, is the fruit of the vine. Every reader of the Bible will remember how frequently it is represented as a blessing. The benediction pronounced by Isaac on Esau invokes for him "plenty of corn and wine." In the blessing of Judah, the patriarch Jacob spoke of the promised Shiloh as "binding his foal unto the vine, and his ass's colt unto the choice vine; he washed his garments in wine, and his clothes in the blood of the grape." At the close of his sublime song of prophetic exultation, Moses declares "the fountain of Jacob shall be upon a land of corn and wine." In one of the most magnificent poems describing the creative goodness of God, "wine that maketh glad the heart of man," is connected with oil to make his face to shine, and bread that strengtheneth man's heart. By the prophet Isaiah the failure of the vintage is used as an emblem of desolation, and the inhabitants of the land are spoken of as lamenting "for the pleasant fields, for the fruitful vine." Jeremiah, Zechariah, and other prophets, who wrote when dark days had come upon the land, represented the possession of vineyards and the fruitfulness of the vine, as material evidences of Jehovah's returning smile, and in close connection with the announcement of a peaceful time when the wolf and the lamb shall feed together, and the lion shall eat straw like the bullock, is found the prediction that the people shall "build houses and inhabit them, and they shall plant vineyards and eat of the fruit of them."

Eulogy of the vine and its fruit is not at all inconsistent with the strongest possible condemnation of drunkenness. There is no real contradiction between the passages just cited and the statement that "wine is a mocker, strong drink is raging, and whosoever is deceived thereby is not wise." It is one thing to plant vines and thankfully enjoy their fruit in a proper way, and a totally different thing to excite divine displeasure and abuse human nature by an abuse of their generous and valuable products. The most enthusiastic advocate of total abstinence principles, as he sits beneath his own fig-tree and vine, must, if devoutly inclined, be grateful to God for the refreshing shade he enjoys, and the cooling clusters of which he partakes. It would be an unworthy as well as ungrateful return to make to Him who giveth us all things richly to enjoy, to murmur at one of His benefits because it is capable of being misused. The conduct of Noah, who planted a vineyard and drank of the wine thereof to his own disgrace, has been painfully copied by too many of his descendants; but their suffering has been caused by their own folly, and their example is our warning. The greatest blessing may be perverted so as to become the direst curse, but the error lies in the perversion. From the regal gifts of immortality, intelligence, and personal liberty, down to the most ordinary and commonplace necessaries of life, every good thing humanity possesses may be warped and blasted by ignorance, stupidity, and sin. Is the giver therefore to be blamed and his bounty despised? No. The thought would be impiety, and its utterance a crime. "Every creature of God is good, and nothing is to be refused, if it be received with thanksgiving." Abhorrence of intoxication and earnest efforts to prevent the spread of wine-drinking may co-exist with high appreciation of the fruit of the vine. It would be unreasonable to regard barley as a curse because having been deprived of much of its nutritive value by the malster, it may be used by the brewer in the manufacture of ale and porter. Not less improper would be the wholesale condemnation of other cereals which are employed by the distiller for the production of a fiery poison. The base of alcohol exists in an extensive variety of vegetable forms, and from it the product can easily be obtained. Sir Samuel Baker, when detained by Kamrasi in the wilds of equatorial Africa, distilled whisky from a kind of sweet potato, using a simple arrangement of bamboos and an earthen pot. The absence of glucose from vine fruit would render the goodly clusters simply valueless. Its presence is essential for nutrition as well as for gratification. However strong may be the objection to converting the fruit of the vine into intoxicating drink, facilities for its growth need not be regarded as an evil. On the contrary, the favoured country where the vine flourishes luxuriantly, and bears its precious fruit in welcome abundance—where both soil and climate render its cultivation easy and profitable—may be esteemed now as it would have been in the days of the patriarchs, as "a field which the Lord hath blessed."

It is fortunate for the purposes of this essay that the parallel between the natural features and products of this country and those of the lands of the Bible is so close, because we are thereby better able both to understand and appreciate Scriptural allusions to the fruit of the vine. Those allusions vary widely in their character from highest eulogy to deepest deprecation. Under some circumstances it might be difficult to reconcile their opposite and sometimes apparently contradictory character, but situated as we are the task is easy. We can bestow warm commendation* on the natural products of the vine, while we utter the strongest condemnation on the results obtained by their artificial and unnatural treatment. We may assert their usefulness in the one case, while we deplore their harmfulness in the other. We may use them with thankfulness as given by God, while we pledge ourselves to touch not, taste not, handle not, as they are perverted by man. We can recommend the one as nourishing and healthful, while we denounce the other as the prolific cause of physical, mental, and moral disease. In short, while dwellers in an Australian climate, who are also inhabitants of a vine-growing district, know by experience how to prize as a superlative benefit the refreshment and food afforded by the luscious fruit of the vine, they also know by unhappy but incontestable evidence, that the alcoholic liquors obtained from it by fermentation and distillation often prove the most serious evil and terrible curse which the community endures. Thus, therefore, it involves no inconsistency to employ terms of strongest reprobation when speaking of alcoholic wine, even when the vine itself is regarded as an inestimable blessing.

One of the allusions already quoted strikingly suggests the primary use of vineyards :—" They shall plant vineyards and EAT *of the fruit* of them." Such, as will be shown elsewhere, was and is still their principal use in oriental countries and ancient times. One main object of this essay being to detail the most valuable uses of vine fruit, both Scriptural and classic allusions will prove of essential service. We have no quarrel with the fruit itself, but there is just ground for humiliation that depraved inclinations and vicious appetites overpowering the voice of reason, even though it is aided by the light of science and the testimony of Scripture, have combined to demand that a blessing shall be turned into a curse, and that human ingenuity, prompted by desire for gain, continues to minister to the unhealthy craving. We utterly deny that fermented wine is wholesome, but, discriminating between the evil and the good, we felicitate ourselves on the capabilities which Australia possess for the culture of the vine. Instead of antagonism, there is perfect harmony between Scriptural allusions when their true character and objects are understood. Nor does our earnest protest against wine-making as generally practised involve any opposition to the cultivation and proper use of grapes, for the growth of which we have one of the finest countries in the world.

Dwellers in Europe usually think and speak of Australia as a whole, but the colonists themselves know that it is as incorrect to make the description of one locality apply to every part of this island continent, as it would be to ignore the dissimilarity between Lapland and Italy. Even in one colony widely different characteristics present themselves. The traveller who crosses South Australia from Port MacDonnell to Palmerston will pass through about 28 degrees of latitude—a distance nearly as great as that which separates Rome from St. Petersburgh. It is, therefore, impossible for the habitat of the vine, or the necessary conditions for its successful cultivation, to be universal. The districts near Adelaide have proved especially suitable, but it has found a home in every colony on the continent of Australia. Queensland and Western Australia devote but little of their area to vineyards, but in the other three colonies the land under cultivation is reckoned by thousands of acres, and the wine annually produced by hundreds of thousands of gallons. The following table is taken from the Australasian Statistics compiled by Mr. Henry Heylyn Hayter, the Government Statist of Victoria, and will show at a glance the attention paid to viticulture in the three principal colonies during the last four years :—

VICTORIA.			NEW SOUTH WALES.			SOUTH AUSTRALIA.		
Year	Acres	Wine in Gallons	Year	Acres	Wine in Gallons	Year	Acres	Wine in Gallons
1873	5,222	562,713	1873	4,526	575,985	1873	5,217	733,478
1874	4,937	577,493	1874	4,308	684,258	1874	5,051	648,186
1875	5,081	755,000	1875	4,459	831,749	1875	4,972	727,979
1876	4,765	481,588	1876	4,457	799,709	1876	4,554	493,217

From this table it does not appear that the industry is in a very flourishing condition. The yield last year was exceptionally small, owing to the drought and disease among the vines. In all three colonies there is a diminution of acreage, which is probably owing to experimental vineyards being abandoned as unsuitable. In proportion to its population much the largest area is devoted to vineyards, and the greatest quantity of wine produced in South Australia. Possibly this may partly be accounted for by the fact that agriculture and husbandry seem to be the specialty of South Australians, a larger proportion of the people in the other colonies being employed in mining, manufacturing, mercantile, and pastoral occupations; but much is also due to the suitability of the country for this purpose. In the opinion of competent judges the neighbourhood of Adelaide is exceptionally favourable to the growth of the vine; but before considering this point, and turning away from these statistics, it may be as well to notice the formidable nature of the task before temperance reformers which they reveal. Vine growing and wine making have become recognised and important industries. Colonial wine is not universally popular, but the demand for it was followed by the supply in 1875 of 2,314,728 gallons; and this, be it remembered, for a population in the three colonies of 1,640,366 all told. Those who look upon the manufacture to be an evil, and the consumption a destructive injury, may as well face the fact, which shows it to be an evil of gigantic proportions. It is very literally rooted in the soil. Happily it is not growing, but last year 18,776 acres were principally occupied in its maintenance. The true character of the wine produced has been fully exposed as worse than worthless, and I hope to show equally clearly that there are other methods by which viticulture may be innocently and profitably carried on.

Experienced vignerons confidently affirm that the conditions of soil, situation, and climate which the vine requires to bring its fruit to perfection are found in many of the settled districts of South Australia to an extent which is unsurpassed by the most famous vine-growing countries of Europe. For some kinds of grapes, plains and tablelands, if not more than 750 feet above the sea level, are best; but generally slopes ranging from that altitude to 1,120 feet are preferable. Of such localities, and of the different kinds of soil suited to the various classes of vines, there is abundance. The vine-grower needs to understand the nature of his land, whether it is heavy or light, argillaceous or limey, and to make his arrangements accordingly. The luxuriance and productiveness of his vineyard will greatly depend on his taking skilful advantage of the conditions he discovers; but with ordinary care and attention he may certainly ensure success. M. Bourbaud, who has had large European experience, after studying the soils found in various localities, and the sorts of grapes cultivated, has expressed himself in the most decided terms. He says, without hesitation, "that an enormously large portion of the lands within 50 miles radius from Adelaide, which at present remain uncultivated, furnishing only a scanty pasture, and thus yielding a minimum return to their owners, might easily be planted with vines which would yield a large return."

The mean summer temperature of Adelaide is almost identical with that of Marseilles and Madeira, and, thermometrically considered, there is much resemblance between the climate of Australia and that of Portugal and Spain. So far as heat is concerned, therefore, the climate is all that could be desired to bring grapes to perfection. Other climatic conditions are equally favourable. It is proved that the free circulation of air is necessary, and that a clouded though mild atmosphere is unsuitable. The direct rays of the sun are found by actual experiment to have a potent chemical effect on the leaves of plants, and the maturing of fruit. Our long summer heats and the many days during which the sun shines with unclouded splendour are felt to be peculiarly trying to the human frame, but they are just what the vine requires. The light of the sun is both food and life to it, and it is to the abundance of this powerful agent that the superiority of the Australian climate for the purpose of vine-growing is mainly due, there being no country in the world where grapes ripen more thoroughly and perfectly. Speaking of the adaptation of the vine to Australia and its rapid acclimatisation, Dr. A. C. Kelly waxes eloquent. He says:—"The excessive droughts, which are the bane of the Australian colonies, are borne by the vine with great hardihood. The hot wind, our sirocco, may blow its furnace breath for twelve or even twenty-four hours, leaving the country a dreary brown waste. The dingy foliage of the trees and shrubs, and the brown hue which New Holland assumes as her summer garb, become more sombre and sad after the severe ordeal. Amidst this desolation, the vine retains its verdure, to cheer the eye and heart of man, an everlasting emblem of hope and endurance to stimulate him and reward his exertions. The Eucalyptus and Mimosa frequently succumb under the desolating influence of a succession of dry years, and many die in the long droughts; but the vine lives and bears its fruit, unscathed by the general blight; and while the native monarchs of the forest, the aborigines of the ground, perish, this little exotic plants its roots in the soil and bravely holds its ground; a fit type of the European settlement in the Great South Land."

Having thus seen that the claim of Australia to be regarded as naturally fitted for the culture of the vine is well founded, and that the vine itself may justly be regarded among our most valuable possessions, we may proceed without prejudice against it to consider the best methods for utilising its fruit. It has come to be the fashion in this country to regard wine as the principal object for which vineyards should exist. Even in statistical returns no mention is made of the quantity of fruit grown. The figures given refer to the area occupied, and the product is stated only in gallons of wine. Any other use for the fruit seems to be regarded as accidental or subsidiary. This is an inversion of the order of nature. Grapes are first of all fruit, and fruit is food. The conversion of food into drink, and regarding that as its primary use, is putting that first which ought to be last.

The idea that grapes are simply unmanufactured wine is so common among us that we are liable to regard it as universal, but such is far from being the case. The Rev. Henry Holmes, a missionary, wrote in 1848:—"The largest part of the produce of the vine in Asia Minor and Syria is used for other purposes than making intoxicating liquor. In both these countries, three quarters of the people, being Moslem, neither make nor drink it, and yet by far the largest portion of the vineyards is owned by these same people." The Rev. S. Robinson, missionary at Damascus, in 1845, says that from August to December "bread and grapes are substantially the food of the people," and that grapes are dried in large quantities to be used as an article of food in the grape season. In 1840, the

Rev. Eli Smith writes from Syria, after careful investigation:—"Wine is not the most important, but rather the least so, of all objects for which the vine is cultivated. The vineyards of Bhandum cover an unbroken space about ten miles long by half a mile wide. During the season of grapes, which lasts about three months, they form the principal food of the inhabitants. Besides what is thus consumed, the village makes about 180,000 pounds of raisins, one-third of which is for home consumption, and about 24,000 pounds of *dibs* (grape molasses), all of which is for home use. The wine made is an item of no consideration, amounting only to a few gallons." These statements are all taken from "Bibliotheca Sacra," and strikingly illustrate the primary use and great value of the fruit of the vine. Gadsbury, in his "Wanderings," republished last year, says of the grapes in Palestine, the finest are dried as raisins, "and the juice of the rest after being trodden or pressed out is boiled down to a syrup, which under the name of dipbse, corresponding with the Hebrew word for honey, is much used by all classes."

Such reports as these suggest a pretty nearly complete answer to a question sometimes flung at the heads of temperance advocates. It is asked—supposing your views to be generally adopted, what would become of vineyards and their proprietors? The question is something like that of the Maori chief, who when asked to abandon his favourite pastime of war with its horrid accompaniment of cannibalism, exclaimed in perplexity, "But what shall I do with my barrels of gunpowder?" I need not dwell upon the unity and inhumanity of principle which underlies both enquiries. It would be better far for both agents of destruction to be themselves destroyed, than to continue wreaking injury on the race. The question with which we are concerned meets teetotallers in a practical way, and is capable of a practical answer. Viticulture need not be abandoned or vineyards destroyed. They may be profitably managed both for the class which produces and that which consumes. Grapes are useful for food, whether plucked frseh from the vine, or preserved by drying, and from their juice a palatable, refreshing, nutritious, and wholesome beverage may be made without any portion of it being converted into alcohol.

It would be a work of supererogation to speak of the deliciousness of the finer varieties of table grapes. No fruit that grows is so universally popular. It is food, drink, and medicine, all in one. It has the advantage of being as wholesome as it is agreeable. The salts contained in grapes render them peculiarly healthful to most people during the trying heats of the summer, and their other chemical constituents afford valuable nourishment. The demand for them is enormous, and they can be grown here at little cost. A practical grower has informed me that vineyards near Adelaide will pay well if 7s. per cwt. can be obtained for grapes in the market. If retailed at three-half-pence this affords a profit of one hundred per cent. to the dealer, and yet provides the consumer with a cheap luxury. The increasing population in towns and other places unsuited for vineyards supports the belief that the demand is not likely to diminish. Large quantities are exported from Adelaide to Melbourne. It is probable that more South Australian grapes are sent to Victoria every year than are sold in Adelaide. If care is taken in selection and packing, and promptitude in dispatch, the demand is practically unlimited. The primary use of grapes may therefore be regarded as both valuable and profitable for all parties.

It may be objected that some of the commonest varieties of grapes are only suited for wine-making, and that the soil and climate of certain vineyards are unsuited for the growth of table-grapes or raisins. This is unfortunate, but it is clearly the fault of the grower. There is no more justification for choosing inferior kinds of grapes than of apples, and the same judgment ought to be exercised in selecting a site for a vineyard as for an orangery. There is an advantage which vines have over some other fruit-bearing plants, in that the change from one kind to another is neither difficult nor costly. Cuttings of valuable sorts are readily obtainable, grafting is easily done, the plant itself is hardy, and even the loss of time involved by the substitution is not serious, for although a season has to be wasted, it is a year of rest for the root, from which it will afterwards profit. It would be folly to expect success unless attention is paid to essential conditions. The nature of the soil, its situation and aspect, the character of the climate, and the most suitable kinds of grapes, all require to be studied. Practical knowledge is also needed of the most approved methods of cultivation, gathering, conveying to market, and preservation. Manuals of viticulture are plentiful, but without the knowledge born of experience it, like any other pursuit, may easily become a failure. Provided, however, there be the necessary practical acquaintance with the subject, combined with industry, appliances, and skill; considering the natural advantages Australia possesses for the culture of the vine, there is no reason why it should not become one of the staple and most profitable industries of the land.

The Scripture references and allusions to oriental habits which have already been made indicate the direction in which we are to look for means of legitimately and profitably preserving the fruit of the vine without impairing its purity. By an elaborate and artificial process it is now generally polluted and perverted into the form of a death-dealing drink. Simpler methods have been known and practised for thousands of years by which its wholesomeness and purity have been retained. Two of these have to be noticed. The fruit may be preserved as raisins, and without its purity being impaired by the destructive process of fermentation; and the juice may be preserved in the form of *un*intoxicating wine.

CHAPTER II.

RAISINS.

Raisin-drying in California—Use of fruit-trays—Artificial process—Sweating —Packing—Financial prospects of the industry.

It is unnecessary to speak of the value of raisins as an article of commerce or of domestic use. Equally unnecessary is it to do more than say that they can be made as economically and as good here as anywhere else. These facts are well known. Hitherto as an industry raisin-making has not taken a leading position among us, but enough has been done to show what can be accomplished. In California of late years a large amount of attention has been given to the subject. Some of the newspapers have discussed with the pertinacity of inventors the merits of rival "driers," but it is agreed that sun-dried fruit is better than any other, provided the climate will allow it to be brought to perfection. As economy has to be considered, the simplest method—that which dispenses with extensive drying-grounds and frequent handling of the fruit—is pronounced to be the best. Mr. R. B. Blowers, of Yolo County, says:—"We use the fruit-tray first introduced by G. G. Briggs, of Davisville, who is the greatest producer of raisins in California. The size of the tray is two by three feet, made of lumber one-half inch thick, weighs five pounds and holds 20 pounds of grapes, which, when dried (with us) makes seven pounds of raisins. We pick directly on the tray, in order to save handling and mussing the grapes, and then leave the tray on the ground between the rows, giving a greater exposure to the sun by placing lumps of earth or other material under the north end. When the drying is about half completed, the grapes are turned thus: two men, taking an empty tray, place it on the one to be turned, then giving it a swinging circular motion, turning it bottom up, they replace it on the ground and go to the next. It is plain to be seen that in this manner two men can turn more than ten men in the old way (one bunch at a time). This turning occupying only a short time, when the dew is nearly gone and the stems tough, does not break up the bunches and make so many loose raisins. When the grapes are sufficiently dry, they can be placed in large sweating boxes, or placed in piles on piles in the packing-rooms while yet on the trays, and, when sweated enough to toughen the stems, they are packed in layers of five pounds each, either in one-quarter, one-half, or whole boxes, holding respectively five, ten, and twenty pounds."

It is manifest that this plan has many advantages over the old drying grounds. In the latter plan, each bunch of grapes had to be turned separately, at the expense of much time and labour; and by the handling of them the bloom is liable to be injured as well as the clusters otherwise damaged. Besides this, the tray system is simple and efficacious in preventing the grapes from injury by rain. In the latter stages of the curing process, a sudden shower may, by superinducing the formation of mildew, spoil the whole crop. To protect the raisins from this, the trays can be rapidly packed in layers, and an empty tray be inverted on the top, which thus provides an impervious shelter. In an uncertain state of weather, this advantage is obviously very great.

Numerous and costly appliances have been adopted for drying raisins by artificial heat. Drying houses capable of holding nearly 100 tons at once are employed in some cases, but there is difficulty in preserving the bloom, and avoiding what is known as a cooked taste. In constructing a drying-house, it appears essential to obtain facilities for exactly regulating the supply of heat, and maintaining a rapid current of air, otherwise the moisture evaporated is liable to condense. Into the merits of the Alden, Blowers, and other driers we need not enter, but their advocates claim for each special excellence. Full particulars can be obtained from Californian newspapers. It seems agreed, that artificial drying is a useful finishing process ; when grapes partially sun dried require to be got ready rapidly for exportation, or when, as at the end of the season, natural heat is insufficient to complete the work. Mr. Blower's plan is, as the season advances, and it is desirable to hasten the process for rain or any other reason, such as heavy dews, fogs, or cold weather, to take the grapes while yet in the trays into the drying rooms, where, without fear of loss, they are speedily dried. Provided that proper precautions are taken, and the heat not allowed to rise much above 110 degrees, it is stated that partially sun-dried grapes thus treated preserve their bloom, and are equal in all respects to those entirely cured in the open air.

After the raisins are dried, a sweating process is necessary. This is done in order to toughen the stem, and if it is neglected they are apt to break, thereby spoiling the bunches. It is effected by placing the raisins packed in close boxes in a drying-room as nearly airtight as possible, and leaving them there one or two days. It is convenient to have wooden trays such as those previously described, and in that case boxes are unnecessary, as they may be removed at once from the vineyard to the sweating-room. The same result may be obtained by simply piling the raisins in a heap and leaving them so till the sweating is accomplished.

In order to turn out the fruit in finished and attractive style, the question of packing is very important. As previously mentioned, the Californian growers employ boxes of uniform size, the largest of which contain twenty pounds, the others being graduated on the same standard. The convenience of this plan is obvious in computing the contents of half and quarter boxes. They are usually planed on both sides, of light material, from a quarter to five-eighths of an inch in thickness, and chamfered at the angles. Clean white paper is placed between each layer of raisins, and the process of packing is thus described by Mr. G. P. Rexford, who has had extensive experience:—"The operator is provided with a packing frame, which consists of a band of stiff sheet-iron shaped to fit the inside of the raisin-box, and two inches high, with a moveable bottom. Into this is first placed a layer of the more perfect bunches, and the remainder is then filled up, until by the scales it contains five pounds of fruit, care being taken to clip off all superfluous stems and imperfect berries. When the frame is full, a paper of suitable size, with the corners cut out so as to permit of folding down over the fruit, is placed upon the top, and over all is laid a wooden or metal slide. The whole is now turned upside down over the raisin-box, the slide is withdrawn, and the frame and contents drop down into the box. The frame is lifted out, the raisins being kept in place by pressure upon the moveable bottom, which is afterwards taken off. The four paper flaps are then turned down over the fruit, and the box is ready to receive the next layer. This operation is repeated until the box is filled." He considers it important to fill the boxes so tightly that the pressure on the cover when it is nailed down shall prevent any shifting of the bunches, by which the appearances of the contents of the boxes would be damaged.

It appears certain that sooner or later raisin-making, as well as the production of dried fruits generally, will be more largely practised among us than it is at present. Of the grapes grown here the Sultana has some advantages over most others. Being small, it is disposed of more quickly, and is also free from the large stones which in some kinds are so objectionable. The ordinary Muscatel, which bears heavily and is exceedingly abundant, is admirably suited for this purpose. In California the grape most approved for raisin-making is the white Malaga. There can be no doubt that as a pursuit raisin-making affords good prospect of commercial success. I am informed on competent authority that a practically unlimited quantity of raisins may be disposed of at about 37s. per cwt. In California it is reckoned that three pounds of grapes go to one of raisins, and it may be assumed that the proportion here will be very nearly the same. Now as grapes can be purchased at 7s. per cwt., and even less, it is evident that at the price quoted above there is a very fair margin of profit for the drier. Were wine-making abolished for ever, our vineyards would still remain as a flourishing source of national wealth. So long as table grapes can be sold retail at one penny to twopence per pound, they will furnish a fair return to the grower, and if they fall below that price they will pay well to be preserved as raisins, which are never likely to be worth less than 37s. per cwt. As to the quantity of grapes which may be gathered per acre, no definite statement seems possible. Vineyards, vines, and seasons, all vary in their productiveness;

but Nordhoff says that in California the yield is from four to five tons per acre; and in South Australia it may be presumed to be about the same.

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CHAPTER III.

UNFERMENTED WINES.

SECTION I.

ANCIENT WINES.

"Wine" not necessarily fermented—Ancient wines diverse—Boiled wine—Aristotle—Columella—Use of drugs—Homer—Sweet wine, Columella—Cato's "Family wine"—Fumaria or ovens—Filtration—Pliny—Adulteration customary—Arts borrowed from Asia—Wines deficient in alcohol—Pliny, Horace—Drinking customs.

IT is a commonly received opinion, that the term "wine" can only be applied with propriety to an intoxicating liquor, and that from time immemorial it has been made and used in a form closely resembling that which is sold in wine-shops and hotels. We shall see that this is utterly incorrect. Other means always have existed, and exist now, for preserving the fruit of the vine in a much less hurtful form. Not all of them merit approval, on account of their wholesome and innocuous character; but among them we find some which were better than the highly deleterious drinks at present in popular use. Between the three sections into which this chapter is divided there is a close connection. Ancient customs shed valuable light on Bible references to wine, and these endorse our estimate of the uses to which the fruit of the vine is applied.

An exhaustive discussion of ancient wines is impossible in the space which can be devoted to the subject. They were widely different in character. It is known that many of them were highly intoxicating, but it is equally certain that many others contained little or no alcohol. Very often they were preserved by other means than fermentation, their strength resulted from the processes by which they were made and the addition of a wonderful variety of ingredients from which they derived a stupefying rather than an intoxicating quality.

All writers on ancient wines refer to the frequent custom of boiling. Redding says almost all the Greek islands produced wines, many of which were *vino cetto*, or boiled, and were used either alone or to mingle with other growths. The terms "Sapa" and "defrutum" are of constant occurrence, the former of which signifies the juice of the grape boiled down to one-half, and the latter to one-third of its former bulk. The liquor in this state must have been of the consistence of syrup, intensely sweet, and without a particle of alcohol. It appears to have been the foundation of many kinds of wine, and to have entered largely into the composition of mixed wine. The thick, sweet, luscious character of ancient wines favours the supposition that most of them received some such treatment. Aristotle describes the wine of Arcadia as so thick, "that it was necessary to scrape it from the skin bottles in which it was contained, and to dissolve the scrapings in water." Coupled with another reference by the same philosopher to "wine that would not intoxicate," there is clear proof that the liquor was not fermented, and yet was called "wine."

Columella gives the following recipe for making a luscious drink:—"Take from your lake *mustum lixivium*, that is, the juice which drops into the lake before the grapes have been trodden; the fruit from which it is made should be gathered on a dry day from a vine trained to other trees *(arbustivo genere)*. Throw into four gallons of this must ten pounds of the best honey, and after it has been well mixed pour it into a stone jar, and immediately plaster the vessel with gypsum, and order it to be placed in the store room. After thirty-one days it will be necessary to open the jar to strain the must, and pour it into another vessel, closed hermetically, and then place it in an oven." Although the liquor was not boiled the action of the oven would equally prevent fermentation; it must therefore have been a non-intoxicating drink.

Homer, the most ancient of classic poets, whose descriptions are universally believed to be very correct, frequently mentions the potent drugs which were mixed with wines at a very remote period. He tells us that Helen threw into the wine which she prepared for Telemachus "delirious drugs, which were grief-assuaging, rage-allaying, and the oblivious antidote for every species of misfortune." He further says that Helen brought the knowledge of these drugs from Egypt.

> "The drugs so friendly to the joys of life,
> Bright Helen learned from Thone's imperial wife,
> Who swayed the sceptre where prolific Nile
> With various simples clothes the fattened soil."

This allusion sheds a flood of light on Scripture condemnations of mixed wine and strong drink.

Frequent references are made to sweet wine by ancient writers, and the following recipe from Columella will afford an idea of the character of such unfermented liquor, and one mode of its preservation :—"That your must may be always as sweet as when it is new, thus proceed :—Before you apply the press to the fruit, take the newest must from the lake, put into a *new* amphora, bung it up and cover it very carefully with pitch, lest any water should enter; then immerse it in a cistern or pond of pure cold water, and allow no part of the amphora to appear above the surface. After forty days take it out, and it will remain sweet for a year." These wines, although sweet, were still refreshing, because diluted. This dilution was sometimes very great. Pliny speaks of five and eight parts of water to one of wine, and Homer says of the Maronean wine, it was diluted with twenty parts of water.

But other than sweet wine was familiar to the ancients which yet possessed no intoxicating qualities. Cato's recipe for making family wine, to be used through the winter, was as follows :—"Put eighty gallons of must into a vessel, and sixteen gallons of sharp vinegar; pour into the vessel at the same time sixteen gallons of sapa (wine boiled down to one-third) and four hundred gallons of pure water; let these be mixed well for five days successively; to these ingredients add eight gallons of old sea-water; put the cover on the vessel, and close it up firmly for ten days. This mixture will keep until the solstice of the following year, and if any of it remain after that period it will be very acid and very beautiful." It is not easy to read this instruction without making a wry face, but whatever the wine was like it could not have been very intoxicating. After drowning the must with five times its bulk of water, the addition of vinegar and sea-water was hardly necessary to prevent its being a strong drink, although it is pronounced "very beautiful."

Among other means employed by the Romans to prevent or destroy fermentation, *fumaria*, or ovens were used. According to Redding the wines were exposed to the action of smoke. The effect of this was to mellow by warmth, mature, thicken, and at the same time impart a smoky flavour. It is evident that this treatment must necessarily have destroyed or greatly lessened their inebriating character. Even if alcohol had been produced the heat of the *fumaria* or ovens would have caused it to escape.

Another process described by Pliny is that of filtration. He says :—"The most useful wine is that which has all its strength broken or destroyed by the filter." Plutarch also refers with strong commendation to this mode of preparing wine :—"Wine is rendered old or feeble in strength when it is frequently filtered; this percolation makes it more pleasant to the palate, and the strength of the wine is thus taken away, without any injury to its pleasing flavour. The *strength or spirit being thus withdrawn or excluded*, the wine neither inflames the head nor infests the mind and the passions, but is much more pleasant to drink." The able and learned author of "Anti-Bacchus," to whom I am indebted for several of the above citations, says this filtering was generally performed before it could have fermented. Gluten is essential to fermentation, and the frequent filtration of the must would deprive it of this necessary ingredient. He quotes from Dr. Ure's Dictionary of the Arts a statement that fermentation may be either tempered or stopped among other means "by the separation of the yeast, either by the filter or by subsidence. This agrees with the remark of Pliny, that "all the power of wine is broken by the filter." There is a singular chain of evidence just here. The hard-drinker of those days sought a wine of which he might drink large quantities without intoxication, and therefore demanded filtered wine. The physician declared wine of that kind to be the best, and God announces at the gospel feast wines well refined, or repeatedly filtered. This combination of testimony proves that the most popular beverages of old were utterly unlike modern alcoholic wines; and further, modern chemistry proves the scientific character of the means employed to render wine innocuous in the days of Pliny and of Isaiah.

Probably adulteration of wine was carried on to as great an extent in ancient times as now. Strength was desired by the votaries of Bacchus, but it was obtained by other means. Connoisseurs exercised their skill in the production of exquisite or fashionable flavours, even as with us, and called drugs and aromatics to their aid. Homer frequently refers to the potent drugs mixed with wine to make a divine beverage. Ulysses describes "a sweet black wine, a divine drink which Maron, the priest of Apollo, had given him. It was sweet as honey, was imperishable; when drunk it was diluted with twenty parts water; and from it a sweet and divine odour exhaled." Everything about this description indicates that the liquor was a sweet, strong, aromatic, boiled and unfermented liquor. In the Iliad the hero is represented as refusing a wine which, sweet as honey, produced lethargy and forgetfulness—evidently drugged, not fermented.

From the Greeks the Romans borrowed their arts, as the Greeks had obtained theirs from Asia. There is no reason whatever to believe that the art of manufacturing or drugging wine was their own discovery. It is probably as old as Jewish history. Pliny describes a vast variety of substances, such as millet, dates, figs, pears, myrrh, balsam, wormwood, hyssop, and scores of others which were employed in wine-making to render it medicinal, stupefying, or aromatic.

How deficient the generality of ancient wines were in alcohol, is evident from Pliny's statement that Falernian was the only wine from which a flame could be kindled, and yet they had no less than 390 varieties! The conclusion seems irresistible, that although the ancients possessed fermented wines their most esteemed and popular beverages had but little intoxicating quality. Horace, who was an enthusiastic wine-grower, in one of his odes praises his "innocent Lesbian," which he elsewhere describes as sweet, like nectar, resembling ambrosia, perfectly harmless and not intoxicating.

One important fact remains to be noticed. Ancient drunkards gloried in drinking large quantities without becoming drunk. To this end incentives to thirst were taken, one of which, mentioned by Redding, was pumice-stone! Pliny says "the glory of the Tricongius was much renowned." The practice thus extolled consisted in drinking three gallons of wine without faltering, vomiting, expectorating, wasting, or leaving a single drop, and after he had drunk it he was to be able to fulfil the duties of the morning watch. The Emperor Maximus, it is said, "could drink six gallons without inebriety." Alexander, after drinking two days and nights, "called for the cup of Hercules, which held six bottles, and was in the act of emptying it a second time when the angel of death arrested him." These disgusting feats clearly show the low spirituous strength of the liquor, and its wide dissimilarity from colonial wine or "fine old crusted port."

Without desiring a reproduction of either the beverages or the practices of these ancient wine-bibbers, we may learn from their customs that fermentation is not necessary to produce wine. The liquor is known by this name, whether preserved in ovens or *fumaria*, by boiling, filtration, or any other way; whether fermented or not; sweet, acid, aromatic, or bitter, it is still wine. The ancient customs and modes of manufacture, as recorded by classic writers, are useful in enabling us rightly to interpret the mere incidental references to wine contained in the Bible.

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SECTION II.

SCRIPTURE WINES.

General appeal to the Bible—Mass of evidence—"Wine" a generic term—Dr. W. Ritchie on "Scripture Wines"—The position assumed—Scripture language about wine—Nine words for wine—Evidence of facts—"Tirosh"—Vine fruit in its solid form—"Yayin," general term for vinous liquor—Usually spoken of with warning—"Shechar" sweet drink, always mentioned with warning—Minor words—Conclusion—No approval in Old Testament of intoxicants—New Testament concurs—Modern wine-making and distillation unknown.

Several things combine to invest Scripture references to wine with special importance. Abstainers and their opponents both appeal to the Bible for support of their argument. Very different and at first sight contradictory language is held respecting it. Advocates of intoxicating wine as a proper beverage point triumphantly to passages which describe wine as a blessing, and teetotallers emphasise the statement that "wine is a mocker." Believers in the Bible have striven to reconcile these seeming discrepancies, and its enemies have gloated over them for other reasons than those connected with the main point at issue. Additional interest and some acerbity has been imported into the question by the Sacramental controversy, which has subjected it to a searching investigation.

The mass of evidence which has thus been gathered will enable us, without entering into other questions, to arrive at definite conclusions respecting the subjects with which we are immediately concerned. Regarding the general testimony of the Bible concerning strong drink in the light of ancient customs, it is evident that intoxicating wine does not receive the sanction and approval which is sometimes supposed. On the contrary, it is spoken of with disfavour and warning. The encomiums pronounced in the Bible on the products of the vine do not refer to inebriating drink, but to those products preserved and used in their purity. The Biblical consensus is with us on both sides of the discussion. It condemns both the cause and practice of inebriation, and commends what have been already described as the most profitable and valuable uses of the fruit of the vine.

Readers of the Bible who allow themselves to be perplexed by the apparently contradictory language employed, seem to forget that "wine" is essentially a generic term. Hot and eager disputants on both sides employ it as though it exclusively referred to the fermented juice of the grape. As a matter of fact it not only may, but does cover a wide area. It is and always was thus employed. There is strong similarity between the Hebrew, Greek, and Latin terms, which correspond to the English term "wine," and they are supposed to be derived from the Hebrew root which signifies to press or squeeze. Originally therefore they all denote a liquid which has been expressed from fruit, without distinct relation to its subsequent treatment and ultimate character. When the full significance of this fact is clearly apprehended, many of the apparent difficulties entirely vanish. In the Bible "bread" is used to denote all the provisions of the table, and "corn" to express a great variety of different kinds of grain. These are generic terms, and wine is in the same category.

Scripture wines have been examined in an able and exhaustive manner by Dr. Wm. Ritchie. An enlarged edition of his treatise was published in 1874, in which every allusion to wine in the Bible is examined and classified. The enquiry is conducted in a spirit of profound reverence for scriptural authority, and I cannot do better than avail myself of the result of his industry and erudition. The position he aims to establish is thus stated :—"THAT GOD IN HIS WORD GIVES NO SANCTION TO THE USE OF STRONG DRINK AS A COMMON BEVERAGE, BUT THAT THE VOICE OF THE BIBLE IS AGAINST IT."

Inasmuch as the Bible mentions different kinds of wine, the natural enquiry at the outset is—What is their specific character? In what respects do they differ? There is the remarkable fact patent to every English reader of Scripture, that wine is spoken of there both with praise and blame, as a blessing and as a curse. Is the Scripture inconsistent with itself? Does it in one place promise a thing as an enjoyment to be sought, and in another denounce it as a temptation that must be shunned? It will not do to reply to this that it is the right *use* alone which is praised; it is the abuse that is blamed. This answer neither satisfies our doubts as to what is the right use, nor meets the facts of the case. It is *wine itself* that in some texts is declared a blessing and in others a curse. It appears impossible that this opposite phraseology can by any latitude of interpretation be applied to the same thing. This diversity of expression proves beyond all reasonable doubt a difference of character in these wines. The conclusion seems irresistible that it is an innocent unintoxicating wine which the Spirit of God in His Word commends; while it is a deleterious inebriating wine which He condemns.

The difference of character thus inferred is rendered more obvious to the student of the Bible in the original Hebrew. It is there found that *nine different words* are used, which are rendered as wine in our translation. Common sense repudiates the idea that all these denoted the same thing, in favour of the probability that they each referred to a distinct species of wine which the name was used to describe. This probability is strengthened by observing the different usage of the terms. The same kind of language is not applied indiscriminately to the things in question as though they were alike innocent or noxious. "On the contrary, the thing denoted by one of these terms (*Tirosh*) is without a single exception spoken of as a blessing; not a syllable of disapproval or of caution is utter respecting it in the whole Book of God. Again, the thing denoted by another of these words (*Shechar*) is almost with the same uniformity represented as a curse; and, unless in one solitary instance, in the early history of the Hebrew people where it is mentioned in connection with a religious observance, it is in every other case spoken of as an evil, only evil, and that continually. Once more, the thing denoted by another of these words (*Yayin*) is represented as very doubtful in its character, a possible good, yet generally an evil; and hence, for one text in Scripture which speaks of its use with approval, there are three that point to it with warning. These are the facts—what are we to make of them?"

Moses Stuart thus observes—"Wherever I find declarations in the Scriptures respecting any matter which appear to be at variance with each other, I commence the process of enquiry by asking, whether these declarations respect the same object in the same circumstances? Wine and strong drink are a good, a blessing, a token of divine favour, and to be ranked with corn and oil. The same substances are also evil; their use is prohibited; and woe is denounced to all who seek for them. Is there a contradiction here? a paradox incapable of any satisfactory solution? Not at all. These substances were employed by the Hebrews in two different states; the one was a fermented state, the other an unfermented state. The fermented liquor was pregnant with alcohol, and would occasion inebriation in a greater or less degree in all ordinary circumstances; and even where not enough of it was drunk to make this effect perceptible, it would tend to create a fictitious appetite for alcohol, or to injure the delicate tissues of the human body. The unfermented liquor was a delicious, nutritive, healthful beverage, well and properly ranked with corn and oil. It might be kept in that state by due pains for a long time, and even go on improving by age. Is there any serious difficulty now in acquitting the Scriptures of contradiction in respect to this subject? I do not find any.

"My final conclusion is this, viz., that wherever the Scriptures speak of wine as a comfort, a blessing, or a libation to God, and rank it with such articles as corn and oil, they mean—they can mean only such wine as contained no alcohol that could have a mischievous tendency; and that wherever they denounce it, prohibit it, and connect it with drunkenness and revelling, they can mean only alcoholic or intoxicating wine."

This conclusion is strengthened by the concurrent voice of history. The Rev. Dr. Nott says—"That wines of such different qualtities, and presented in such different aspects, and even in such frequent and frightful contrast, were one and the same article, in one and the same state, would seem, even though history, both sacred and profane, had been silent, quite incredible. How much more so, now, that in place of science, history, both sacred and profane, has spoken, and spoken not of their identity, but known and marked dissimilarity."

According to Dr. Ritchie, there are two hundred and twenty-nine texts alluding to wine in the Old Testament. Of these the large majority are translations of the three Hebrew terms Tirosh, Yayin, and Shechar. Lists are given of all these texts with marks indicating their character. The general tenor of Scripture respecting these three substances presents wide dissimilarity. "Tirosh, is indicated universally as a good; Shechar, as a common beverage, is indicated as uniformly as an evil; and Yayin in the great majority of cases in which its character is defined at all, is spoken of with warning."

The word Tirosh occurs thirty-eight times, and with a single apparent exception is uniformly spoken of as a blessing without one word of caution or warning. After enquiring what is here signified, and examining the texts cited, Dr. Ritchie concludes—"That the word does not denote any liquor at all. It means vine fruit, the produce of the vine in the solid form of grapes, raisins, &c."

In support of this conclusion he appeals to the objects with which it is connected. Everybody is familiar with the phrase "corn, and wine, and oil." *Dagan*, the Hebrew term employed for corn, denotes *field produce*, including wheat, barley, millet, beans, lentiles, cucumbers, and perhaps rice. *Yitzhar*, the term rendered "oil," signifies more properly *orchard fruit*, such as figs, olives, pomegranates, citrons, &c. As there are here two solids, it is reasonably concluded that the third is also a solid, the whole forming in this view "the triad of blessings which constituted the staple possessions of Palestine," viz., field fruit, vineyard fruit, and orchard fruit. "It is worthy of special remark that *Tirosh* occurs thirty times in connection with Dagan, twenty-one times it is associated with Yitzhar, and it is found only six times unconnected with either of these words." Dr. Lees observes that "though the three terms are employed through a period of one thousand years, by a series of fourteen authors, the bulk of whom also use *Yayin* or *Shenen* continually in conjunction, yet in not one instance have they crossed *Tirosh* with *Shenen*, or *Yayin* with *Yitzhar*. On the contrary the triad of generic terms have been cautiously and correctly discriminated from words merely denoting some of their species, or artificial preparations from them." Further it is associated with other things, such as the earth, cultivated land, the vine tree, the first fruits, and offerings or tithes which were mainly the first gathered fruit or grain in their natural state, and the term Yayin, confessedly a liquid, is never thus associated through the whole Bible.

That *Tirosh* is a solid is further supported by reference to the things with which it is *not* connected, such as bowls, cups, or pots. It is never spoken of as being poured out, or used as a fluid. Both positive and negative evidence therefore sustain the belief that *Tirosh* means vine fruit. The conclusion is obvious and important. Thirty-eight witnesses in favour of wine are shown to speak only on behalf of the natural produce of the vintage. Their testimony is withdrawn from intoxicating liquor, and given to the view which this essay maintains.

More frequently than all the other terms put together the word *Yayin* is used by the sacred writers in reference to wine. It occurs one hundred and forty times, and with great variety of expression. Sometimes connected with religious ordinances, it is spoken of twenty-six times as a promised or permitted enjoyment, thirty-one passages are regarded as doubtful or neutral, and *seventy-one* texts brand it with warning. It is a word of very general meaning, and denotes various kinds of wine. It sometimes signifies the growing fruit of the vineyard, the newly expressed juice or must, fermented wine, and wine mixed with drugs. This generality of signification, referring to the juice of the grape, explains the varying tone of Scripture concerning it. Ater carefully examining the various texts in which the word occurs, Dr. Ritchie concludes that as the Hebrews, like other ancient people (as shown in the last section) habitually prepared non-intoxicating as well as intoxicating wine, the approbation refers to the one and the reprobation to the other. Of the warning texts Dr. Lees says twelve denounce it as poisonous and venomous, nine expressly prohibit it in certain cases, and five prohibit it without any reference to circumstances at all. It is so strongly prohibited because it contains the intoxicating principle. Dr. Ritchie's conclusion is that in all the passages in which *Yayin* occurs there is not the shadow of sanction for the use of intoxicating wine.

The term *Shechar* signifies sweet drink or sweet syrup. Like *Yayin* it is a generic term. It denotes liquor made from dates, other fruit, and grain. It is usually translated "strong drink" in our translation, but Dr. Ritchie says there is nothing in the Hebrew equivalent to the epithet "strong." That it does not apply to the juice of the grape is evident from the frequent connection of the terms *Yayin* and *Shechar*, translated wine and strong drink. This being the case it need not be further noticed except to remark that in every case except one (Deut. xiv. 26), which suggests nothing as to character, whether fermented or not, it is mentioned with warning.

Still less need is there to dwell on the other terms. *Asis*, grape or other fruit juice, occurs five times, and is generally translated new or sweet wine. *Sobhe*, inspissated or boiled wine, is used thrice. Hhamar or Hhemer, foaming liquor, is mentioned eight times, and seems to be the Chaldee equivalent for the Hebrew *Yayin*. *Mesech*, mixed wine, is employed thrice. *Shemarim*, choice wine, "wine on the lees," four times; and *Ashishah*, cake of dried fruit, four times. The latter term seems to have puzzled the translators. They have rendered it flagons, and flagons of wine; the literal meaning, however, is said to be as stated above; in Hosea iii. 1, it is literally cakes of grapes.

The conclusion drawn by Dr. Ritchie from the Old Testament teaching concerning wine is that not one sentence in the Bible sanctions or approves the use of intoxicating liquor. "Numbers of the texts usually appealed to for this purpose do not refer to wine at all; others, again, mentioning it with approval, plainly denote an unintoxicating wine; while others that allude to an intoxicating liquor contain solemn warnings not to LOOK upon it."

Into the discussion on New Testament allusions to wine I need not enter, further than to observe that the Greek word usually employed (*oinos*) is a generic term equally with *Yayin*, which both in form and meaning it closely resembles. Those who desire to pursue the subject further can easily procure Dr. Ritchie's work on "Scripture Wines," and if they desire to hear the other side will find it stated with learning and ability in a pamphlet entitled "Yayin," containing a series of speeches on the Bible wine question, edited by Professor Watts, of Belfast. They will look in vain, who rightly interpret the Bible, who search either the Old Testament or the New, for any eulogy of alcoholic wine. When the modes of manufacture recorded by classic writers are connected with Scripture allusions, it becomes clear as the light that the quotations from sacred literature often used in reference to modern wine are utterly misapplied. They have Scripture as well as reason and humanity on their side who contend against such pernicious liquor, and urge the employment of some less hurtful method of preserving and using the fruit of the vine. It is certain that wine-making as it is now carried on had no existence among the Hebrews. Such manufacturers as we are familiar with, and their various appliances, had never been established. Distillation was unknown. Fermented wine was made, but only to a limited extent, and even then its evils were denounced, and its use reprobated. The chief uses of the prolific vineyards, and those which elicited the approving language, were first of all enjoying the rich clusters in the time of the vintage, and afterwards preserving them or their product in a non-intoxicating form.

SECTION III.

Modern Unfermented Wine.

Not a lost art—Commonly practised—Sulphuring—Salicylic acid—Mr. Frank Wright's method—His offer of suggestions—Preservation in casks—Application of heat—His explanatory letter—Description in *Christian World*—Four necessary qualities—Genuine—Palatable—Wholesome—Economical—Can be made more cheaply than fermented wine—Australia better than London—Keeping qualities and superior cleanliness—Hon. T. Reynold's recipe—What is wanted—Who will remove the reproach?—A suggestive incident—Its application.

The preparation of wine which retains the good qualities of the grape without being intoxicating or otherwise injurious is not a lost art. All that is required is to prevent the must from fermenting and thus producing alcohol. Various means for accomplishing this are known, and more extensively practised than is generally understood. Prejudice and custom have much to do with the difficulty many people have in comprehending how anything can be called "wine" which is not alcoholic. Being only familiar with fermented wine, they do not even imagine the possibility of any other, either now or formerly. The common enquiry is, "How will it keep?" Several answers may be given to the question, varying both in simplicity and economy. Professor Miller speaks of an extensive wine-grower on the Moselle whom he asked, "Have you any unfermented wine, juice of the grape?" "Tons," was the reply. "How old is it?" "Some of it fully ten years." He then proceeded to describe the two methods he adopted. One was by boiling, the other by the "sulphur cure." The latter he preferred, filling the cask nearly full, then burning sulphur in the empty portion, and while the fumes were still there fastening all tightly by the bung. The must thus preserved was used for mixing with other wines. Professor Miller points out the correspondence of these processes with those of older times, and remarks that there need be no difficulty in understanding how the recent juice of the grape, pure and harmless, may be drunk not only in the grape season, but at any time of the year, either pure and simple, or diluted with water; so forming a nutritious, harmless, and palatable beverage.

"Sulphuring" is a process constantly adopted by wine-makers. When a small quantity of sulphur is burned in a cask it absorbs the oxygen and forms sulphurous acid. This acid deprives the air of the organic substances it contains, which have the power of causing fermentation. By its action in the ferment it prevents acetous degeneration, and is therefore employed to check fermentation. Sometimes strips of coase paper or cloth, which have been dipped in melted sulphur, are burned; but a better way is by igniting a portion in an iron cup suspended from a tapering bung. When must is thoroughly saturated with sulphurous acid prepared in this manner, it is rendered wholly inert, and fermentation absolutely prevented. The process of making the sulphured wine called *muet* is thus described by Redding:—In the south of France a quantity of wine is made called *muet*, for which purpose the grapes are trodden and pressed at the vintage, and the wine is fined immediately to prevent fermentation. This wine, or must, is then poured into a barrel until it is only a fourth filled; above the surface of the liquid several sulphur matches are burnt, and the bung closed upon the fumes. The cask is now shaken until the sulphurous gas is absorbed, so that none escapes on opening the bung. More must is then added, and fresh sulphur, and the cask treated as before. This is repeated several times until the cask is full. *This must never ferments.* It has a sweetish taste, and a strong smell of sulphur. Proof spirit is added, and the mixture, which is chiefly used in mixing with other wines, is sometimes also called Calabrian wine.

This process is almost identical with that employed by Mr. Robert Turner, of Clarendon, and of which an account was published in an Adelaide newspaper some time ago, as a means of arresting fermentation in wines. He says:—"The principle is derived from Baron Liebig's letters on 'Chemistry,' which I have practised for years, so I can speak from experience of the beneficial effect it has to preserve the wine from acidity. The saccharometer is my guide when to stop the fermentation. (I use the brewer's saccharometer). When the specific gravity of the must is reduced to 10 deg. (we call water nothing, consequently we are guided by the figures on the scale), we stop the fermentation by applying sulphur in the following manner. We sulphur the hogshead by burning a strip of calico dipped into melted brimstone. Then we fill the cask half full with wine; take a pair of bellows and blow the sulphur out of the cask, so that we can burn the second match in the cask. We generally take a sniff at the bunghole of the cask to ascertain whether the sulphur is all blown out and the cask filled with pure air sufficient for the second match to burn. After we burn the second match we bung up the cask and give it a good shaking; then we fill up the cask as quickly as possible, and bung it up tight. In large casks we bore two spile-holes in the head of the cask, so we divide the cask into three parts; then we burn three matches in each cask. But I prefer the hogshead or larger casks. We are careful to let the sulphur escape only through the tube of the funnel, or if we run it in with a syphon we bind a cloth around the pipe at the bunghole to prevent the escape of the sulphur. After we stop the fermentation we let it be a fortnight, then we rack it, burning two matches in each hogshead as at the first. Then we rack it three or four times, burning one match in each cask. When the wine is clear we put the finings in, and get it bright before the spring. I believe it is necessary to give it two more rackings—one before the vintage and another before the next spring. After bunging the cask up tight we look after it a short time lest the fermentation should not be stopped. How we ascertain this is by placing our ear on the cask and looking at the bung to see if there are any bubbles around it. By no means loosen the bung until positive the fermentation is not stopped. If not stopped we rack it without delay. In stopping the fermentation remember that oxygen is life, therefore be careful to keep it out of the cask."

Another chemical agent which has the power of arresting fermentation is salicylic acid. So far as I am aware, the principal experiments at present made with this acid on wine have been designed to ascertain its power of preventing acetous fermentation, and other diseases to which wine is liable. Professor C. Neubauer sums up the results of a series of experiments as follows:—

1. That the power of the salicylic acid to stop fermentation stands always in certain proportions to the quantity of ferment cells contained in the fermenting fluid.

2. That salicylic acid, even when applied in very small quantities, stops or considerably decreases the growth and increase of the ferment.

3. That to completely destroy the ferment the quantity of salicylic acid must be proportionate to the number of ferment cells."

It is tolerably certain, therefore, that both of these acids have the power not only of arresting, but of preventing fermentation. That is the point to be arrived at in preserving the purity of the juice of the grape so as to produce a pure, that is a non-alcoholic wine. We shall see presently that they are even now being employed in conjunction for this purpose.

One of the best-known manufacturers of unfermented wine is Mr. Frank Wright, of 68, Kensington High Street, W. London. With the special object of meeting the views of those persons who object to the use of fermented liquor in the Sacrament of the Lord's Supper, this gentleman has for many years prepared wine entirely free from alcohol. Others have done the same, but I need not encumber my pages with any description of various processes in which the same principles obtain. With the special object referred to we have nothing to do, but Mr. Wright's processes and results are of the greatest practical value for the purposes of this essay. Desiring to have ample and definite information on the practicability of introducing his method of wine-making into this colony, I opened direct communication with him. Some of my enquiries were, I feared, of a rather delicate nature, but the frankness of his reply fully set my apprehension at rest. Writing on Sept. 24th, 1877, he says:—"I am with you entirely as to your motives and your earnest desire to check the ravages of alcohol in all parts of the world, and dare not allow my own trade interests to keep me back from rendering any service to that end. I therefore *gladly* respond to your queries, and meet you beforehand by saying that in *all* ways in which I can promote your views I am your very willing servant."

One method adopted by Mr. Wright is to preserve the juice in casks, by the joint agency of sulphurous and salicylic acid. His instructions are that if this plan be adopted the casks must be new, well soaked in water, then sulphured by burning a small quantity of sulphur inside them, in an iron cup let in from the bung, as previously described. There is then to be dissolved in the juice one ounce of salicylic acid to every twelve gallons. This process Mr. Wright informs me he is just now trying for shipment to Norway and Sweden.

The principal method employed is by the application of heat to destroy the germinal particles which cause fermentation. Concerning the wine thus produced Mr. Wright says—"It has stood the test of eighteen years' continuous sale in every climate, and is now used in upwards of 1,000 churches of all denominations. The mode of manufacture is a slight modification of a well-known ancient practice, and effectually preserves the grateful flavour and the rich nutritious qualities of the grape unimpaired."

A question from the Secretary of the Belfast Wesleyan Sacramental Wine Association as to the genuineness of the article supplied by him elicited the following letter, in which, it will be seen, he not only fully explains his process and results, but lays them open to public examination and competent analysis. Notwithstanding the length of this communication I am unwilling to abridge or condense it on account of its great importance in connection with the particular subject now under consideration. Its scientific exposition of the theory of fermentation, its reference to the practices of antiquity, and its statements of the results of many years' experience, are both interesting and valuable. They meet precisely our present requirement, and show a profitable use for the fruit of the vine preserved in its purity which is based on historical, scientific, and experimental facts:—

Kensington, London, November 30th, 1874.

Dear Sir—I am in receipt of your favour requesting me to furnish you with evidence of the genuineness of the Unfermented Sacramental Wine I am now supplying to the Churches, and I note that you require this, not so much to satisfy any scruples of your own, as to remove all occasion of doubt in the minds of others whom you desire to win to your views. I confess that in acceding to your wishes I have some difficulty in doing all you desire. Were your friends in London, or my works in Belfast, nothing would be easier than to resolve all doubts by a personal examination of my stock, and an inspection of the entire process by which it is produced; but since I am precluded by the circumstances of the case from offering this, the most satisfactory guarantee at my command, I must ask you to be content with such information and assurances as I have now the pleasure of submitting.

But, first, let me enquire how it comes to be thought necessary that I should furnish you with evidence of my *bona fides* as a tradesman? Why, I would ask, may it not be assumed, as in the absence of evidence to the contrary in all similar cases it would be assumed, that the article I offer is what it purports to be, and nothing else? Past experience makes it only too easy for me to understand what answer you would return to these questions! The popular prejudices and fallacies concerning the nature of the pure fruit of the vine, and of the wine which is, or is supposed to be, made from it, are the fruitful sources of nearly all the difficulties which are encountered in the endeavour to bring about the substitution of unfermented for fermented wine; and I doubt not these are as rife in Belfast as they are in most other parts of the kingdom. It is not that those who differ from you doubt my honour as a tradesman, but that there is a lurking conviction more or less strong in the minds of most of them that to produce such an article as this wine professes to be, the true fruit of the vine unfermented and free from alcohol, is an achievement which it is utterly impossible to accomplish, or one which is attended with so much diffiulty as to be practically unavailable. This I know to be a very common cause of difficulty, and such difficulty I presume you will have to meet in Ireland. Permit me, therefore, to assure you that despite these popular notions the preservation of the fruit of the vine, in all its integrity, and free from the faintest sign of fermentation, is as simple in theory, and as easy in practice, as the most ordinary culinary operation of domestic life. That grape juice, freshly pressed, and exposed to ordinary conditions, passes in a few hours into fermentation, and becomes thereby transformed into the fermented wines of the shops, is known to all; but it is not so generally known that the essential factor in inducing this change is the presence of certain germinal materials in the atmosphere which, coming into contact with the exposed grape juice, initiate the changes which result in its fermentation. These germinal particles are innumerable in their quantity, and subtle in their influence; but like every other natural cause, they act only under certain fixed conditions, to which they are amenable, and by which they are controlled. If no steps be taken to destroy or exclude them, then, under the proper conditions of temperature and fluidity, fermentation is inevitable; but if this same grape juice be released from its cells without being brought into contact with the atmosphere, or if having been brought into such contact, it is exposed to a temperature of 190° and upwards, fermentation will then be as effectually prevented as if these particles had never existed. In the first case the existing cause of fermentation will be excluded, and in the second it will be destroyed. In this fact we find the explanation of all the modern and some of the ancient methods of preserving the fruit of the vine. Grape juice contained in bottles, and heated to the temperature named, needs only to be securely corked down while this temperature is maintained to ensure its freedom from fermentation to the end of time. During the last fourteen years I have so preserved several thousand dozens of such bottles, and the failures have not exceeded five per thousand. The leathern, or rather the *dried skin* bottles, in use throughout Palestine in the time of our Saviour, were admirably adapted for the execution of this method. With their seams well pitched with the mineral tar commonly used at that period for making vessels of all kinds watertight, and their necks closely tied up, it only needed that the wine should be filled into the vessels while hot enough to destroy all existing germs to ensure its preservation for ever.

It is possible that some of the ancient methods described by Pliny, Columella, and the Geoponic writers were not always so successful; but it is impossible to study the receipts given by them for the preservation of grape produce without being struck with the evident intention which runs through all the details of the processes they describe, and the admirable way in which they are adapted to make this preservation complete. Though knowing nothing of science, incessant experiment and long practice had enabled the makers of these wines to devise processes which were eminently scientific in their fitness, and which needed only to be applied with moderate care to ensure their perfect success. Some of these processes are still in use in the East, and the products are regarded as great delicacies. Two tons of such produce are now in my warehouse; and my business correspondent at Smyrna informs me that more than 12,000 barrels are annually exported from Constantinople to the western and south-western provinces of Russia for domestic use by the natives.

As regards the presence of alcohol in my wine, about which I notice you evince some concern, you will gather from what I have already said that this drug can never exist in wine made by my process, except by accident or oversight. But I am glad to be able to state with the utmost confidence that the details of my operations are so complete, and so close a watch is kept at every stage, that no such accident or oversight has ever once occurred. During the fourteen years I have made this wine it has been analysed many times, sometimes for purposes of Excise, sometimes by opponents desirous of confuting my statements, and occasionally at the instance of friends who have been anxious to assure themselves of their truth; but in not a single instance has a drop of this poison been detected. Some years since a medical gentleman in your city announced that he had discovered a minute trace of alcohol in some wine which he had examined; but I immediately offered a prize of £50 for the production of a single ounce from any quantity of such wine upon which he might choose to operate; but not only was the prize never claimed, but I showed successfully that his supposed discovery was due entirely to unskilful use of tests which even when skilfully used are often illusory.

This challenge has been repeated many times, and is still open to all the world; but I need hardly say that I shall make it a very special part of my daily duty to see that there is not the remotest possibility of it ever being accepted.

Concerning the purity and genuineness of what I sell as unfermented wine I have this declaration to make:—I have prepared this wine for upwards of fourteen years, and during the whole of that period it has been essentially the "blood of the grape." During the earlier years, when the pale wine was chiefly in demand, it consisted solely of "the fruit of the vine," without the addition of colouring or sweetening of any kind. Of late years a demand has arisen for wine of a deeper colour and a sweeter taste than could be produced by the use of any species of grape known to English merchants; and to meet this demand resort has been had to a small quantity of white sugar to give sweetness, and a *teaspoonful* of Caroon cherry juice to each imperial pint of grape juice to give colour. These additions of sugar and cherry juice have never exceeded ten per cent., and often in good seasons not so much as five per cent. of the whole; and have been duly notified to my customers, who have used their own discretion as to the kind of wine they have ordered. Thus far the statement now made applies to my practice from the time I first made this wine down to September last, when the new vintage began; and I pledge my honour to its absolute truthfulness. I am glad, however, to be able to announce that in the course of last summer I succeeded in inducing a Burgundy grower to export to me a species of grape heretofore unknown in this country, having a juice so deep in colour as entirely to supersede the necessity for the use of cherry juice, and so rich in flavour as to add materially to the quality of the wine of which it forms a part. In future, therefore, the unfermented wine made by me will not only be better in flavour than in former years, but entirely free from all artificial colouring.

Having made this statement, I feel that I have said enough to satisfy all who know me of the genuineness of what I offer; but I am not unmindful that, to many of those to whom I am unknown, such a guarantee as my word only can give will be deemed inadequate. To all such I desire freely and frankly to say that, so far as it lies in me to produce evidence for their conviction, no effort shall be wanting on my part to furnish it. My interest in this matter is something more than that of a tradesman, the credit of whose wares is at stake. I am anxious, above all things, that no question of the genuineness of what I sell shall rise up to prejudice, for a moment, the great question which is being discussed with so much earnestness by the Churches on both sides of the Atlantic. Whatever, therefore, of pride and privilege I may have in this matter I waive entirely, and in a spirit of friendly frankness I make the following OFFER to all whom it may concern:—

If any Church, Society, or other public Institution will charge any one or more members of their own body with the duty of examining the evidence I have to submit, they shall be cordially welcomed to my works, and the following material for forming their judgments shall be laid before them:—

1st. I will produce before the deputation so authorised all my invoices and bills, showing purchases of grapes for several years past, together with a certified statement from my import agent, of my entire importations during that period.

2nd. I will submit for the inspection of the deputation my stock of unsweetened and uncoloured grape juice, the produce of upwards of twenty tons of grapes, now upon my shelves, with liberty to make any examination, or to apply any test they may deem needful.

3rd. I will introduce to the deputation at least a dozen persons—workpeople and others—who have been eye-witnesses and co-workers in the whole process of crushing, extracting, and bottling for several years past, with liberty to examine them as to their knowledge of the whole process.

4th. To solve all doubts as to the practicability of safely preserving the fruit of the vine, I will perform, upon any grapes which may then be procurable, the whole process of crushing, extracting, and bottling, in the presence of the deputation; or I will accept the invitation of any such representative body to do the same thing in any town or city in the United Kingdom.

Lastly, I pledge myself to pay into the funds of any public charity such Church or Society may name the sum of fifty pounds on production of adequate proof by a professional analyst that the declaration I have here made is untrue. Upon this point, however, I make two stipulations—1st, That the analyst shall be a gentleman of good general repute as a chemist, be uncommitted in this controversy, and be mutually agreed upon; and, 2nd, In the event of an adverse decision, the report shall be accompanied by a statement in detail of the method pursued, and the tests employed in the analysis.

Before closing, it will be well, perhaps, that I should refer to the peculiar liability to error to which ordinary observers are exposed when endeavouring to decide upon the character of an article like unfermented wine. Most persons have been so long accustomed to the etherial narcotic flavours produced by fermentation that these have come to be inseparably associated in their minds with the ideas of genuineness and purity, and, instead of regarding them as the *certain evidences of the destruction of the natural product*, their absence is looked upon as proof of the absence of the vinous element altogether.

It is also forgotten by some—even of those whose tastes have not been thus biassed—that, though there is but little variety in the grapes which reach our tables, the number of kinds available for the manufacture of wines, fermented or unfermented, is practically unlimited. Each of these has its own distinctive features of density, flavour, acidity, and sweetness, so that unless it is known beforehand what is the particular kind of grape used in the manufacture of unfermented wine, mere taste and smell are valueless as tests of genuineness. Then, again, in the preparation of such wine *heat* is almost indispensable, and this so materially modifies the taste that few would recognise in the boiled juice the flavour of grapes as they come to table. No cooked fruits have the same taste as fresh; but in the case of grapes the difference is unusually perceptible. But even this alteration in taste is less marked than that which takes place after the juice has been duly corked down and secured. Though no alcohol is produced, a slow process of maturation, apparently identical with that which takes place in fruits stored for ripening, is set up, and a flavour is developed which makes it very difficult to recognise the original juice.

Thus it will be seen that to pronounce off-hand upon the genuine character of an unfermented wine upon the evidence of mere taste and appearance, is, to say the least of it, a rash and unscientific proceeding; and that in this, as in other matters, if we would give fair play to our own judgments, as well as do justice to others, we must bring to their consideration that technical knowledge and special experience without which our opinions are apt to be the mere suggestions of fancy, or the dictates of prejudice.

I am, Sir, yours very truly,
FRANK WRIGHT.

The following description of how "unfermented wine" is made contains references to some points not mentioned in Mr. Wright's letter. It is taken from the *Christian World* of March 17th, 1875, and is a valuable testimony:—"The first process to which the grapes are subjected is that of cleaning, which is effected by passing each basket—the grapes are sent in willow baskets—through a water-douche, by which the skins are freed from any dust or grit which may have been gathered while hanging on the vines, or during package. They are then placed in a grape mill, which is so constructed that while the grapes are crushed the pips and stalks are not broken. A point of some importance is thus gained. The skins of grapes contain an astrigent, and the stalks a bitter property. The pips also contain an acrid, fatty matter, which if allowed to pass into the 'wine' would give it a rancid and unpleasant flavour. This applies equally to fermented as to unfermented wine. Hence, as we are informed, in nearly all great wine districts the growers or manufacturers have hitherto for the most part objected to every means of 'crushing' grapes, except that of 'treading by the foot.' In wine manufacture many attempts have been made to introduce machinery, but until recently with little success. The mill used by Mr. Wright is of French modern invention, and effectually answers all the purposes required. After having been broken or crushed the grapes are put into a powerful screw-press, which is worked by a ratchet movement, and is capable of exerting a pressure of over one hundred tons when worked by a single man. The effect of this operation is to slowly squeeze out of the grapes all the juice, so that in the result there is nothing left but the skins and stalks. It will give the reader some idea of the amount of pressure applied if we mention that on completion of the process the 'marc' is so matted together as to require to be got out of the press with a pickaxe. While the grapes are thus pressed the juice passes through openings in the laths of the cage on to a surrounding floor, and from thence through strainers into a collecting tub, from which it is pumped into the bottling vat. The process of stripping, crushing, and bottling is continuous, and is so arranged that the time occupied rarely exceeds from fifteen to twenty minutes. In case, however, any accidental suspension of the process should occur, affording time for incipient fermentation to set in (for grape-juice at a temperature of from 50 to 100 degrees Fahrenheit ferments spontaneously if exposed to the atmosphere, from which it is shielded while within the skins of the unbroken grape), provision is made by means of super-heated steam whereby the juice in the bottling vat is quickly brought to a temperature at which fermentation is impossible. After having been strained as already intimated, the juice is drawn off into glass bottles, resembling narrow-mouthed jars, which are capable of holding about six pints, and bearing a high temperature without breaking. As they are filled these bottles are put into a steam-bath and slowly heated to a temperature a little below boiling point. This part of the process occupies about two hours. The bottles are then taken out and instantly hermetically sealed. Arrived at this stage the 'wine' will keep good for any period. A subsequent stage consists in mixing the products of the different species of grapes, used in the earlier processes, in such proportions as are found to yield the most acceptable flavour. These proportions vary with each vintage, as it is found that while no two species of grapes have at any time the same flavour, so also the same kind of grapes vary with the nature of the seasons in consecutive years, yielding in one year a larger proportion of saccharine and in another a larger proportion of acid. When thus mixed the juice is passed rapidly through fine flannel filters and re-bottled in smaller bottles ready for sale. In re-bottling, and while filtering, the effects of atmospheric exposure have to be overcome, which is accomplished by a repetition on a smaller scale of immersion in a steam-bath, and hermetically sealing. This re-bottling can therefore be done at any period of the year. To this general description of the process of manufacturing unfermented wine an interesting fact may be added. The juice of most kinds of grapes is nearly colourless, as any one may readily convince himself by experiment. By the manufacturing of fermented wines the colour is obtained (when nothing artificial is used) by fermenting the skins, which contain the colouring matter, with the juice. This colouring matter, though not soluble in the juice of the grape itself, is easily extracted by the alcohol formed during fermentation. In the earlier period of the manufacture of unfermented 'wine' at Kensington, this colouring difficulty was met (without any concealment on the point being attempted) by using for colouring purposes the juice of the caroon cherry. There is now, however, no further necessity for this resource. By the use in sufficient quantity of a particular kind of grape, which is grown abundantly in the south of France, the juice of which is itself highly coloured, 'wine' manufactured in the main from grapes whose juice is colourless, can be sufficiently coloured. *It may also be mentioned as a marked and curious feature in this method of preserving grape-juice, that while the heating process has the effect of almost entirely removing the distinctive flavour of the grape, this flavour is gradually regained by keeping; thus realising the fact in the case of unfermented as in fermented wine that 'the old wine is better than the new.'* "

Four particulars appear to be required in such wine as is here described, in order to justify its general recommendation. It must be genuine, palatable, wholesome, and economical. On each of these there is satisfactory evidence. The article in the *Christian World* is manifestly written with the utmost impartiality, and the one point strongly insisted on is genuineness. Concerning its freedom from alcohol there is no room for doubt.

As to its palatable character, no higher or more conclusive statement is required than is furnished by Dr. Hassall's report in the *Lancet*, which contains the following:—"Mr. F. Wright (of Kensington) exhibits what he calls Sacramental or Passover Wine, which consists of the unfermented juice of the grape. . . . *It forms a very palatable beverage.*"

With regard to its wholesomeness, from a number of testimonials I have selected three from medical men, one being from each of the three kingdoms of England, Scotland, and Ireland. It will be observed that while testifying to its usefulness, they also contain incidental allusions to its agreeableness:—

FROM N. S. KERR, ESQ.. M.D.,
Formerly of Liverpool, now of London.

"As I have been employing your wine lately for medicinal purposes, I think it right to inform you of the result of the experiment, as far as it has gone. I have found it very useful in cases of prostration arising from various causes, and have administered it, in these cases, in preference to alcoholic liquors (the usual practice of the profession), inasmuch as I find it more easily assimilated, much more strengthening, and entirely free from all injurious and unnatural stimulus."

FROM DR. F. R. LEES, F.S.A., EDIN.

"I am quite satisfied with the latter specimens of your red Sacramental

Wine, and have the utmost confidence in its purity. I have found it very beneficial in several cases of consumption and fever, and eagerly desired by the patients."

From John M. Hodges, Esq., M.D., F.C.S.,
Public Analyst for Antrim County and Belfast Borough.

"I have chemically examined the bottle of Wright's Unfermented Wine (selected by my son from the stock kept by Mr. Wright's agent in Belfast), which I received, and find that it is free from alcohol, and contains the constituents of grape-juice. When mixed with water it will prove an agreeable beverage."

Satisfied that we have here the juice of the grape preserved in unimpaired purity as a valuable article of diet; agreeable, nutritious, wholesome, and under some circumstances peculiarly beneficial, the only remaining question is the financial one. With very many this will probably be the test question. Can the manufacture be made to pay? To this there is an obvious *prima facie* answer. Mr. Wright's published prices are 28s. per dozen bottles, and 16s. per dozen for half-pints. This is not a very extravagant figure; even when compared with cheap colonial wine; is far less than ordinary port and sherry; and as the manufacture has been continued for eighteen years, we may fairly conclude that it is a financial success.

We may arrive at the same conclusion another way. Mr. Wright informs me that the quantity of juice yielded by different kinds of grapes varies exceedingly. Some kinds yield seventy per cent. more than others, but in any case the quantity of wine will always be about one-sixth more than the fermented. Any one who knows the appliances, care, time, skill, and labour required to bring fermented wine to a marketable condition, and compares with that process the description given of Mr. Wright's method, will see at once that the advantage is decidedly in favour of the latter. We have therefore a larger quantity, produced at a less cost from the same amount of raw material.

There is yet another basis of calculation. Mr. Wright uses different kinds of grapes, the juice of which being first expressed is mixed according to taste. These grapes cost him in an average season 4d., 6d., and 8d. per pound. Speaking roughly, the average is 6d. per lb., or 56s. per cwt., delivered on the premises. Now, as any quantity can be obtained in Adelaide which will pay the growers to deliver at ¾d. per lb., or 7s. per cwt., it is obvious that the price here might be vastly less than in London. Allowing for some increased cost of labour and appliances, it seems evident that wine of the same quality might be produced here at one-sixth of the London price, that is to say for 5d. or 6d. a bottle, and yet leave a good profit to the maker.

That our grapes are suitable for this purpose cannot be doubted. Mr. Wright assures me that he knows something of their character, and is quite certain they would make a good unfermented wine.

He has very little doubt that if he were in Australia he could make better wine than he now produces.

The keeping qualities of this wine have been tested in various climates for many years, and its general excellence is attested by its having received honorable mention for good quality at the International Exhibition of 1862. In addition to the process being simple and speedy, it has the strong recommendation of its superior cleanliness. Wine-making is generally an exceedingly filthy process. Dr. Druitt says he was sitting at dinner one day next to a certain Archdeacon from the Cape. He asked him the reason of the earthy taste in the Cape wine. The answer was—"My dear Sir, if you were ever at the Cape, and were to see the blackfellows in the vineyard in the vintage time, and how they make the wine. you would think earthy a very mild term indeed to apply to it." A lady who visited an extensive Cape vineyard last year told me the sight of those blacks jumping out of the vats into the mud and slime, then back again with unwashed feet—and especially one of them, whose leg was torn and bleeding from a wound—taxed all her philosophy, as well as all she was told about impurities working off in the fermentation, to induce her to taste the product. No wonder! That such uncleanliness is not confined to the Cape is evident by Dr. Thudichum's remarks about Burgundy, and other illustrations might be found nearer home.

On a smaller scale the manufacture of unfermented wine has several times been attempted in this colony, and I believe frequently with success. Among others, the late Hon. Thomas Reynolds was accustomed to make a non-intoxicating wine. A member of his family, who personally assured me he had himself both made, used, and much enjoyed it, has kindly handed me the following recipe:—"Crush the grapes well, put through a fine sieve so as to get the juice well out, and then fill the bottles with the liquid. Place the bottles in a flat-bottomed pan without the corks, with the water up to the neck, and boil for about a quarter to half an hour. Cork them up immediately afterwards *quite air-tight*, and *seal* the corks. Then place the bottles in a cellar. The corks must be the very best, otherwise the air will penetrate. There will be a good deal of sediment, so that when using the juice it will be necessary to pass it through fine muslin without shaking the bottle." This may be regarded as a rough and ready plan, but it is based on the scientific laws which have been detailed, and it would be a good thing if owners of small vineyards would thus dispose of surplus produce instead of converting it into fiery and poisonous liquor.

What is wanted, however, in order to bring the method described into general use, is for some right-hearted teetotaller, or perhaps a Company, to invest the necessary capital in an unfermented wine-making establishment. Here is a field for the practical and energetic. Experience alone can teach the right kind of grapes, and the most approved flavours. There must be some risk, and possibly some loss at the outset; but the attempt is worth making. No special skill is required. The description already given of Mr. Wright's process is sufficiently clear for the guidance of any intelligent workman. The only hints he thinks it necessary to add are these :—1. The bottles should be well annealed in order to stand the heat; and 2. They should be made with the necks slightly tapered, the corks also being cut slightly tapering, the two fit each other with little trouble, and expel every trace of air when the cork is pressed gently home.

Will no one undertake this work? If successful, the benefits to be gained would be incalculable. The crimes, diseases, and other evils for which alcoholic wine is responsible are simply appalling, and temperance reformers are often upbraided because while denouncing intoxicants they do not provide a sufficient substitute. Who will roll away the reproach?

Probably the long-established taste for stimulants will prove difficult to overthrow, but if difficulties are to paralyse enterprise there will be an end to all reform. That a market would be found for unfermented wine does not admit of any question. Thousands of thirsty souls would gladly avail themselves of it, if it were accessible, and proved to be palatable and refreshing, which may be considered as certain. At the Aylesbury Dairy Show, in England, a company began to sell milk at a penny a glass. About a thousand glasses were sold in a short time, and the sale was only stopped because the refreshment contractor, finding his counters suddenly deserted, threatened the authorities with an action for damages.

This incident is suggestive. The lesson it teaches well deserves careful consideration. To those who are bold enough to meet the vendors of intoxicating liquors on their own ground it affords great encouragement. Among the various means available for checking the ravages of intemperance not the least important is that of providing an innocent, wholesome, and attractive substitute for alcoholic beverages. People will drink. To find fault with a natural appetite would be folly. The truest wisdom is to provide for its harmless gratification. Unfortunately intoxicating drink, which instead of satisfying the appetite inflames it, is not only the most popular but often the most accessible. We are warranted in employing all legitimate means to destroy its power and invade its province. It is one of the direst foes with which our country and our race has to contend. It peoples our gaols, fills our asylums, crowds our hospitals, desolates our homes, and wastes our wealth. It enfeebles the body, debases the mind, and perils the soul of every victim it ensnares. It falsely assumes to be a useful and essential article of diet, and by exposing this fallacy we may fairly hope to weaken its hold on public sentiment. If this can be accomplished it will be matter for profound gratification. A further advantage will be gained by making widely known the most profitable and valuable uses of the fruit of the vine. It may be anticipated that by this means something will be done to diminish its abuse, and to hasten the adoption of a more excellent way.

APPENDIX.

PART I.

The following references to profitable methods of preserving ripe grapes, packing them for export, and manufacturing raisins, will, it is believed, be read with interest. They are taken, with a few slight verbal alterations from the essay by Mr. J. Merson, of Victoria:—

I.—Preserving the Fruit.

The subjoined extract is from "The Grape Culturist," by A. S. Fuller, of New York:—

"The process of preserving is very simple and requires more common sense than science. The requisites are—1st. The fruit should be thoroughly ripe, should not be bruised or broken, but carefully handled while gathering and packing. The fruit may be put away on shelves or packed in small boxes. The latter method is probably the best, as it is more liable to become shrivelled when left in an open room than when confined in a smaller space. Boxes that will hold from thirty to forty pounds are of convenient size, and the fruit will retain its flavour much better with twenty pounds in a box than when there are only five pounds. The boxes should be shut tight; if there should be need of ventilation, it can be given by opening the box, but constant ventilation of them is only another name for continual evaporation, which would cause the fruit to shrivel, and thus destroy its value.

"A cool and steady temperature should be maintained, and if it could be kept between 35 deg. and 40 deg. there would be but very little trouble in keeping the fruit, and even if but little care were given to the packing, very few persons have a room or cellar that can be kept at 40 deg., consequently more care is necessary in gathering, packing, &c.

"A warm, *damp* atmosphere is very injurious, as it will soon cause the grapes to rot, but the presence of considerable moisture will do no harm provided the temperature is low.

"There are various materials used in packing grapes, many of which are good, while others are positively injurious. Sawdust is used in packing the Malaga grapes, which are so common in our market, but the flavour of the grape is always injured more or less by it, giving them a woody taste. Cork-dust is far better than common sawdust, but it cannot be obtained except near cork manufactories, and perhaps not there to any amount. If any such material is to be used there is none better or more readily procured than chaff of rye, wheat, or oats. Rice chaff would be, probably, still better.

"When the grapes are gathered bring them into a cool room, and spread them out upon a table or shelves, and let them remain there for a few days, until all the surplus moisture has passed off, then pack them away in boxes as follows:—Spread a thick sheet of paper on the bottom, then lay out a layer of bunches, placing them close together, then another sheet of paper, and so on until the box is full.

"Boxes deep enough to hold four or five layers are better than deeper boxes. When the boxes are filled, put them away in a cool place, where they can be examined occasionally, and the decayed berries be taken out from time to time as they appear. If the place is cool and the fruit sound and ripe, they will keep three or four weeks without further care."

II.—Packing Grapes for Export.

With increased facilities for carriage by rail and ships tons of grapes would find a ready market at a fair price, if proper care is taken in packing. In London shiploads of splendid grapes are imported for many months after the vintage, mostly by the Jews of Duke's-place. The grapes are packed in boxes, the interstices being carefully filled up with dry non-resinous sawdust; in this way they travel well. As soon as delivered they are taken out, the sawdust removed by a pair of common bellows; any faulty berries are removed with a pair of long thin scissors, a harmless artificial bloom is powdered, and it would take a good judge to tell if they were just plucked from the vine or not. The retail price was from 8d. to 1s. per lb. American vine-growers succeed in disposing of large quantities of grapes at a good profit. Hundreds of tons are conveyed from 100 to 2,000 miles by rail. The boxes are packed lightly (without sawdust), placed in long railway cars; at the end nearest to the engine a large chest of ice is placed, and a revolving fan, worked by the axle of the van, keeps the grapes cool the whole journey. This cooling process can be adapted on shipboard, at far less expense of room and machinery than Mart's freezing process, which is adapted for the conveying of fresh meat to England.

III.—Drying Grapes; Hardy's Method.

The following is the plan adopted by Mr. Hardy, of Bankside, near Adelaide, as related by himself:—

"In fruit drying I have had several years' experience, and think

I am coming near the right way to do it. Raisins are the principal fruit I dry as yet, and all from the Muscatel Gordo Blancho, which is a better bearer than what is known here as the Muscat of Alexandria, although the grapes are very similar. I have tried the Malaga Muscat, a fine large black grape, but find them too difficult to dry, and the skin too leathery for good table fruit. I have seen a few made this season from a grape I got over from Sydney, called the Bowood Muscat, a very fine black grape; but which, like the Malaga, has no Muscat flavour. I gather my grapes for table raisins as soon as they are fully ripe, selecting the finest bunches, and removing all faulty berries, and lay them on trays, made of paling 5ft. x 2½ft., at the vine, handling them as little as possible, as the least touch takes off a portion of the bloom. Those intended for pudding raisins are afterwards gathered, and carried in boxes to a large table, where they are examined, and all faulty and unripe grapes removed. They are there put into sieves having long handles, and dipped into a boiling lye made from the ashes of the vine cuttings. If I am short of ashes I use common washing soda, 1¼lb. to the gallon of water. They are then spread evenly on the trays, and put out in the sun to dry, taking them under cover when there is a fear of rain. When nearly dry enough I bring them into a room filled up with racks to take the trays, leaving a space of nine inches between the trays and nine or ten high. When full the room is shut up close, and treated with flues to 120 deg. or 130 deg. Fahrenheit for twenty-four to thirty-six hours. When they come out of this they are easily rubbed off the stalk, and are ready for packing. They usually take from a fortnight to a month drying, according to the weather; but I intend next season to increase my drying rooms, and bring them in every evening, and keep the heat up at night, and take the advantage of the sun and wind by day, and expect to shorten the time by half or more, and so obviate the dust, which is the greatest trouble we have to encounter. Raisins are turned once or twice while drying, by placing an empty tray upside down on a full one, and the two capsized together. I have found by trial that it takes four tons of good grapes to make a ton of raisins, and I think the grapes can be grown in suitable land to pay at a farthing per lb., which with eight tons to the acre will give £18 13s. 4d. I estimate the drying on a large scale at one penny per pound, and the packing and boxes at another halfpenny, leaving 2½d. per lb. as the cost to the producer. I am getting from 4½d. to 5d. per lb. for my raisins now, as the quality of them is become known to the trade, and I am encouraged to graft again this season a large number of the inferior wine-grapes, but you will readily understand that this result has been brought about by persevering for several years through great disappointments and failures from not knowing the right way, and in overcoming the prejudices of the people to a colonial-made article."

IV.—A Small "Dryer."

The following description of a drying room, extracted from "Drying Fruits," by E. Lucas, may be useful to owners of small vineyards:—

"All drying rooms have to expel a more or less quantity of moisture out of the fruit intended to be dried by means of heated air. Those moist vapours have to be removed from the drying rooms, which may be done if the construction has openings on the tops for the escape of the strongly-heated moist air, or pipes may be placed on the bottom to allow the moist moderately-heated air to escape.

"The frame on which the fruit is exposed to dry may be light trellis or wicker work, with boards a couple of inches high around the side to prevent the fruit from falling off the frame.

"The drying room, which contains about 300 lbs. of fruit, and finishes the drying in twenty-four hours, is 6 ft. 6 in. high, 3 ft. 8 in. long, and 2 ft. 6 in. wide. The lower part of this construction is the hearth, 1 ft. wide, 6 in. high. It is divided into three parts, of which each contains three frames for the reception of fruit. The smoke is carried off by a sheetiron pipe, 8 in. x 2¼ in. broad, which goes in snake form under and over three partitions until it is let out at the top. This will show that the heat is pretty equally distributed throughout this drying room. A rather small pipe is placed on the top to promote the escape of moisture."

PART II.

The following suggestions as to the various economic uses of the fruit of the vine are from the essay by Mr. A. W. V. Cameron, B.A., of New South Wales. In order to economise space it has been necessary to abridge the writer's references to "Green Grapes," "Raisin Food," and "Preserved Grapes." The Committee would especially direct attention to the suggestions to vine-growers with which the series closes.

I.—Green Grapes.

Several methods may be suggested for utilising the green fruit.

1. *Grape a la Olive.*—Large green sour grapes should be carefully picked from the bunches, and placed in bottles with a slight sprinkling of salt. The bottles should be exposed to a hot sun for about two hours, when the fruit will shrivel and lose its colour. The bottles are then to be filled with clear cold spring water, corked

tight, and set aside. The grapes will form a good substitute for olives, and keep for any length of time.

2. *Grape Capers.*—Small grapes are to be chosen, salted, placed in bottles filled with vinegar, and then allowed to stand in the hot sun for a day or two.

3. *Grape Pickle.*—This is an Indian preparation. To every three grapes should be added one chili pod, and to the whole bottleful a handful of cloves, black pepper, bits of ginger and of cinnamon well broken up, also a handful of shelled pistachro nuts, almonds, or walnuts. The bottle is to be filled with vinegar, corked, and kept for a month before using.

Green grapes are also used for superior Indian chutnee and other condiments, and their juice when iced, sugared, and flavoured makes a delicious and wholesome summer beverage.

II.—DRYING GRAPES. THE "ALDEN" PROCESS.

The following description of the "Alden" dryer was contributed to the *Town and Country Journal* at the request of the essayist:—

"The pneumatic or Alden process may be briefly described as a method for maturing and preserving animal and vegetable substances, in part through evaporation, and in part through chemical binding of their organic moisture, by exposing the same to a current of heated and humid air, increasing in humidity and decreasing in heat as the evaporation proceeds, the current of air moving in the same direction with the articles to be treated.

The principal part of the apparatus as described, consists of a vertical chamber or shaft, 20 to 25 feet high, and 3 to 5 feet square, containing a series of frames, one above the other, four and one quarter inches apart, covered with wire netting, and moved upward all together by endless chains. The heating stove is placed under this chamber, from which currents of air, heated to any required temperature, pass up, through, and around the frames. On each frame is spread ten or twenty pounds of fruit; the lowest frame is first placed in the chamber directly over the heat at the bottom of the shaft, where it remains from two to six minutes. It is then moved up four and a quarter inches, and another frame of fruit is placed beneath it. At regular intervals, the whole series of frames are moved upward four and a quarter inches, and a fresh frame is put on beneath them, until the frames are all in, containing (if apples) 15 to 30 bushels of fruit. At this time, the shaft being full, one frame is taken off at the top, and another one put in at the bottom, at regular intervals, varying with the variety of the fruit treated, and the thickness of the slices or pieces. Each bushel of apples contains about forty pounds of water, which is seized by the ascending air, and passes with it up, through, and around the fruit as the moisture is taken gradually from it, enveloping it to the last in a cloud of vapour.

The pores of the fruit are thus kept open, free for the circulation and exit of vapour, until all the free water is removed, the remainder (26 per cent.) being held as hydrate. It is well known that fruit will not mature, ripen, or sweeten up in strictly dry weather, nor in cold wet weather. The Alden evaporated fruit follows the law of nature in this respect. It does not become, therefore, a dried fruit in the ordinary acceptation of that term, but it is preserved in its own concentrated juices, and will keep for years in any climate. The flavour is retained, and the development of glucose or grape sugar is perfect.

The best form of building for working three to five of the Alden evaporators is a balloon-framed three-story building, about forty by thirty feet, twenty-eight feet high. The fruits, vegetables, &c., are received, prepared (peeled, sliced, &c.,) and put into the evaporators on the first floor, and passed upwards through the machines to the third floor, where they are removed or thrown down through openings to the second story to be packed.

In California, if a fruit-grower has an evaporator of his own he receives the following returns:—Of grapes suitable for the purpose of converting into raisins, each ton will bring £11 at 5d. per lb. for the raisins. The best varieties of grapes for making raisins are the Muscat, the large the seedless Sultana. Currants made by the Alden process are very superior to the sun-dried Zante kind, and they are perfectly free from grit.

Five evaporators will turn out 3,000 lbs. of perfected raisins every 24 hours.

The usual price in California for one of the improved Alden evaporators is £200, including a very high royalty. If any responsible person is willing to enter into the business of making these evaporators, he should communicate with the "Alden Fruit Preserving Company of California," whose address is 426, Montgomery-street, San Francisco; and I am sure he can make most favourable arrangements. The invention has been patented in the Australian colonies."

III.—THE KELLY PROCESS.

This is thus described by an American newspaper:—"The machinery is a tin cylinder ten or more feet long, heated from the inside by steam. It is made to revolve slowly, and the fruit, which has been first ground to a pulp, is allowed to drip on to it from a perforated trough placed immediately above it. The fruit dries in a very perfect manner, preserving all the colour, flavour, and sweetness of the original. The process may go on until the cylinder is coated an inch or more in thickness, when it can be removed by dividing it with a knife and peeling off as from an orange. It is then rolled up and ready for use or shipment. Fruit thus preserved has been taken to sea, and exposed in open boxes through the tropics both ways, without any injury to its preservation qualities or taste whatever. The utility of this machine is not restricted to the drying of fruit or berries, but any vegetable can be ground to a pulp, or any juice can be condensed in the most perfect manner. . . . . . When it is desired to use the condensed fruit, a little water is added, and allowed to stand a short time, then cooked as fresh fruit, when it will contain almost its entire natural taste. The Hon. W. P. Watson, President of the Oregon Agricultural Society, is joint owner, and contemplates visiting California shortly to introduce this machine to the fruit-growers of that State. One advantage it possesses over any other machine is that the size of the fruit is no object, as it will use small as well as large fruit. The only object is that the fruit should be ripe."

IV.—Raisin Food.

This is simply ripe grapes, roughly dried and compressed. In Oriental countries, under the name of kishmish, it forms a staple article of diet for both high and low. Dates similarly treated have found their way into all the grocers' shops, and there is no reason why an equally toothsome and popular article should not be produced from the fruit of the vine.

V.—Preserved Grapes.

Grapes are preserved whole in some parts of the East by being carefully detached from the stalk and packed in layers of cotton-wool. They may be bottled in the same manner as other fruit. A beautiful but expensive process is to pass symmetrical and perfect bunches through a vacuum cylinder in which they are drenched with clarified syrup, giving them a crystallised surface. Grape jelly is made like any other fruit jelly, and only needs care to preserve the delicate flavour of the fruit.

VI.—Vinegar.

"Wine vinegar is of two kinds, *white* and *red*, according as it is prepared from white or red wine. White wine vinegar is usually preferred, and that made at Orleans is regarded as the best. Vinegar is made of the best quality, out of wines which have become more or less acidulous, and are, therefore, of inferior value. When the vinegar is made from well-flavoured wines, it is preferable to every other for the use of the table. The old method consists merely in partially filling a series of large casks, placed in three or four ranges over each other, in a cellar warmed with a stove to the temperature of 85 deg. F., with the wine mixed with a certain proportion of ready made vinegar as a ferment. Low-roofed apartments are the most suitable; when there is a high ceiling it is necessary to elevate the "mothers," in order that they may occupy the higher strata of warm air. This trouble is dispensed with when the roofs are low. Experience has proved that in high-roofed apartments, where the tuns are placed at different levels, the uppermost work off quicker and better than the others. More wine is added, in successive small portions, as fast as the first has become acetified, taking care that a free ventilation be maintained, in order to replace the carbonic acid produced by fresh atmospheric oxygen. In summer, under a favourable exposure of the windows and walls of the fermenting-room to the sun, artificial heat is not needed. Each cask is of about sixty gallons capacity, and into each cask of the set is poured a third of its capacity of vinegar, to which two gallons of wine are added, and weekly afterwards two gallons more. About eight gallons are drawn off at the end of four weeks as vinegar, and then successive additions of wine are made as before to the casks. These are laid horizontally in rows upon their gawntrees, and are pierced at the upper surface of the front end with two holes. One, called the *eye*, is two inches in diameter, and serves for pouring in the charges through a funnel; the other is a small air-hole alongside. The casks should never be more than two-thirds full, otherwise a sufficient body of air is not present in them for favouring rapid acetification. At the end of a certain period the deposit of tartar and lees becomes so great that the casks must be cleared out. This renovation usually takes place every ten years; but the casks, when made of well-seasoned oak, and bound with iron hoops, will last twenty-five years. The wine, as well as the vinegar produced, should be clarified by being slowly filtered through beech chips, closely packed in a large open tun. When wines are new, and somewhat saccharine or too alcoholic, they acetify reluctantly, and need the addition of a little yeast, or even water, to the mixture; and when they are too weak, they should be enriched by the addition of some sugar or stronger wine, so as to bring them to a uniform state for producing vinegar of normal strength. To favour the renewal of fresh air into the upper part of the hogsheads, it would be advisable to pierce a two-inch hole near to the upper level of the liquid when the cask is fullest, by which means the heavy carbonic acid would fall out, and be replaced by the atmospheric air at the superior apertures."—*Ure's Dictionary of Arts, Manufactures, and Mines.*

VII.—SUGGESTIONS TO WINEGROWERS.

The following advice by the Rev. D. Allen is well worth the consideration of winegrowers:—

"Dry your fleshy grapes, such as the Muscat and Alexander, by tying the bunches and hanging them in sheds or lofts; do not bruise them by any means.

"The next fleshy sorts carefully pack in boxes with bran or sawdust, so that they will not bruise each other, cover the top, do not lumber the boxes about, but let them be still in a dry, cool place. One gentleman in France thus has his wine fresh from the bunch at all times from one fruit season to another.

"Take the next less fleshy sorts and press the juice from them when ripe, and put 1 lb. of white sugar to every 1 lb. of juice, and boil them sharp for half an hour in a clean copper or enamelled preserving pan; this makes the very best jelly I ever ate or drank. This can be eaten with bread, pudding, dumplings, &c., and mixed with water makes a pleasant refreshing drink. This wine I could eat with joy and praise before the Lord, as the ancient Jew did eat his wine in the sanctuary of his God. In order to have no waste take the stalks and husks from which you have taken this juice, and put to every pound of them half a pint of water, and boil them together for half an hour, and then strain the liquor from them, and to every two pints add half a pound of sugar, and boil sharp for half an hour; then bottle, cork tight, and use it immediately with water or otherwise.

"Take the most liquid sorts of grapes, press the juice out, and then boil away one-third, and then bottle this concentrated juice and carry it where you like, or use it when and as you like. You may warm this and eat it as you do milk with bread; this is the kind the ancients mixed with milk, and therefore the mixed wine in a commended sense in the Bible, 'Come, buy wine and milk without money and without price.' Many travellers tell us that thousands mainly live on this in great wine countries. They say the poorer people put in flour as they boil it for their meal, and then eat it with their bread; hence the corn for bread, the oil for cake and anointing, and wine for food, was God's provision for millions in ages past, and is for thousands now. Hence the land that flowed with milk and honey literally was, with milk and syrup, wine. The husks of this juice may be done with as those in No. 3.

"Take of liquid sorts and press them clean, or strain it well and put in bottles, tightly cork and pitch or seal them, and cover them in a tub with water, or cover them with wet sand air tight; do it straightway from the vine, then you may use it as you require, to eat with bread as milk, or with milk. But this is best to drink, and most fit for the Lord's Supper. Casks of this may be done in the same way, but when you take the cask out of the water or sand, you must either use it or boil it down as No. 4. The husks from these also may be done with as those in No. 3. The Bible reader will see that this pure juice of the grape was that which the ancients used to press to fill the cup. Gen. xl. 11.

"The same kind of juice put into air-tight flasks and boiled in a copper a few hours will keep until opened. This is one method recommended by Baron Liebig, the great chemist."

These suggestions may be appropriately supplemented by a testimony published in a colonial newspaper, over the signature "Waverley":—"I have in my house at this moment the pure unadulterated juice of the grape, unfermented, yet extracted upwards of eight years ago. It was prepared thus: The grapes were taken when ripe and separated from the stalks; they were then put in a boiler, without any water, sugar, or other ingredient, and boiled until the skins sank to the bottom of the pure juice of the grape thus extracted. This liquor was then strained through flannel bags, three separate times, and bottled. The next morning the bottles were placed in the boiler, up to their necks in water, and the water boiled; they were then taken out, corked, and sealed. Wine thus prepared will keep any time, the longer the better. A sediment forms at the bottom in time, and makes the wine a rich clear colour. I have given this recipe to one or two medical gentlemen, among many others, and all agree that it is unsurpassed in its strengthening, non-stimulating, but nutritive properties. Poured in milk (which it does not curdle) it is a delicious beverage, and for invalids benefited by the grape cure it must be a priceless boon. A little in water makes a wholesome drink for children, and I am sure if those who have large vineyards would send forth such an article, it would meet with a ready sale."

* * *

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